

MOTOR AGE

VOLUME XXI

CHICAGO, MAY 23, 1912

NUMBER 21

What is it you want in a Motor Car?

Is it speed?

Maxwell holds world's speed record for cars in its class.

Is it durability
and endurance?

Maxwell is the world's Touring Champion—the winner of the Glidden Tour.

Is it long life?

Official State registration statistics prove Maxwell cars last longer than any other cars in the world. Over 91 per cent. of cars sold in New York State during 1905-1906 are in active service today.

Is it low main-
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Maxwell proved in public tests conducted by the A. A. A. that it can be operated cheaper than a horse and buggy.

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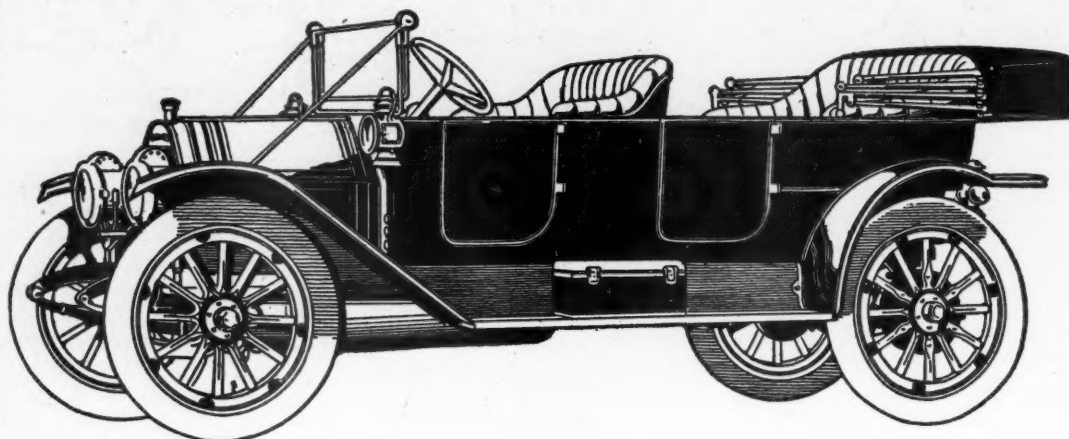
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United States Motor Company

Maxwell Division

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The HAYNES Car

Product of Eighteen Years of Automobile Building

has character. These same qualities which constitute Haynes character are found in a few other motor cars. But in *no* other car selling at *Haynes prices*. Mark that point clearly.

Here in the Haynes is motor car *character*, but we make no added charge for the experience and care and correctness with which the Haynes is built—no charge beyond the fair-square price for such a car, no charge for the prestige of such a car.

So the Haynes offers character *and* economy. Economy *in* the purchase price and economy in maintenance.

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MOTOR AGE

Published by the
CLASS JOURNAL COMPANY
910 South Michigan Avenue
CHICAGO ILLINOIS



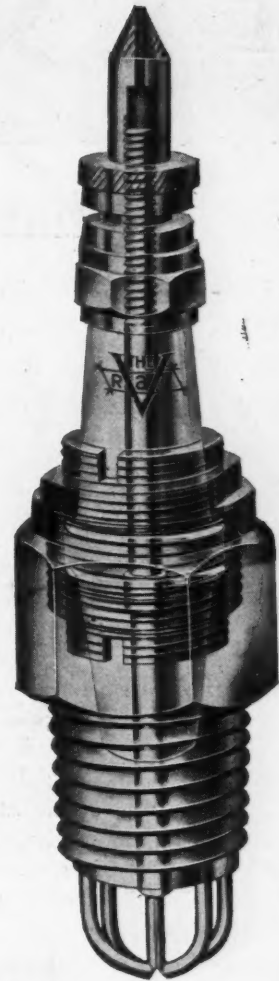
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No. 21

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(Porcelain and All.)

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are the logical choice of every motorist desirous of the utmost in motor efficiency.

V-Ray Spark Plugs

in your cylinders increase power and speed and decrease fuel consumption.

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SUCCESSFUL!

So successful that when the Pierce-Arrow Motor Car Co. was informed of the advent of this system, an order was at once given for one large dryroom, wherein a series of most exhaustive tests was made—with the result that an order for the equipment of the entire works was given, largely completed six months ago.

So successful that a number of other motor car companies, amongst them the best-known in the land, followed immediately and are already reaping the benefits of the system.

So successful that after the system had been installed in three-score of factories, a few people woke up to imitate it, offering old lumber dryers for the purpose, not unchanged, however, but made to look appropriate through the introduction therein of some certain indispensable features—patented to ourselves. Their statements are largely taken from our literature and do not represent their own experience, but ours.

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It will increase the capacity of the finishing quarters at least four-fold.

It will insure absolute regularity in the finishing time required, regardless of the season or weather.

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The great varnish companies, such as Murphy, Standard, Glidden, Valentine, Louisville, Flood & Conkling, American, etc., etc., are all thoroughly informed as to the merits of the system and in position to speak of it in criticism or in praise.

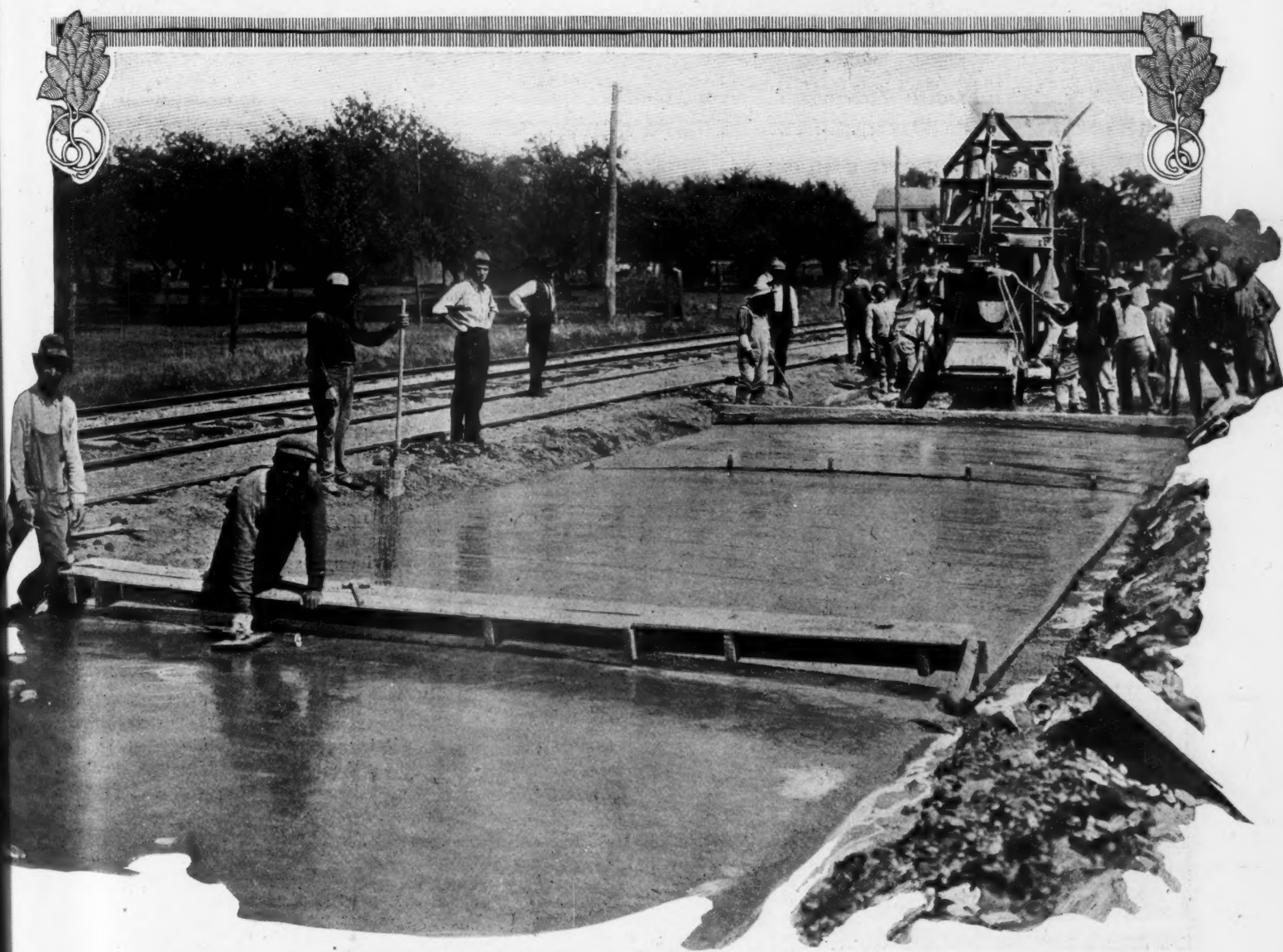
Patent Rights

The pioneer patent, "to provide a kiln particularly adapted for accelerating the drying of coatings of oil, paint, varnish, shellac, etc.," was issued to C. A. Wenborne, April 20, 1909. Another basic patent applicable to the same purpose was issued to Mr. Wenborne January 9, 1912. The rights to other pertinent inventions have been bought by ourselves. We intend to maintain our rights wherever granted, in the manner provided by the law of the land. We guarantee that our designs do not infringe the rights of any one else. We have not licensed anyone to sell designs involving our rights.

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MOTOR AGE

Concrete Roads as Built in Michigan



Mixing concrete in a mechanical batch-mixer which moves under its own power. A long boom projects from the rear of the machine which can be swung in half the arc of a circle. On this boom is a bucket into which the mixed concrete is emptied, after which the bucket is run out on a boom by two men and dumped where wanted. This device does away with a considerable force of men, who would otherwise be necessary to load the materials into the machine and wheel the mixed product from the machine to the road in carts

IN order to obtain a correct understanding of how and why Wayne county, Michigan, is committed to the concrete road, it is necessary to go back a little and show the various attempts made to properly solve the road problem. Bad roads, like the poor, always have been with us. More than 60 years ago Wayne

By Edward N. Hines

EDITOR'S NOTE—Wayne county, Mich., is remarkable for its system of concrete roads which have been built by a commission consisting of John S. Haggerty, E. N. Hines and William Murdoch. In the system are 30 miles of road, the cost of which has been reduced by the state aid law. The first 20 miles of this cost about \$275,000 and state aid reduced the cost to Wayne county by about \$20,000.

county attempted to settle the problem by giving 50 or 60-year franchises or charters to such companies as might be formed to build toll roads leading out of Detroit. The leading citizens of that period, such as Governor Lewis Cass, Zachariah Chandler, Henry Ledyard and others, interested themselves in these toll road projects.



WAYNE COUNTY ROAD OUTFIT PREPARATORY TO STARTING OUT FOR SPRING CAMPAIGN

The first route picked out for their experiment,—for such a venture was then unheard of in this country—was the Howell line via Farmington, the old Grand river road that congress had opened in 1832.

There were two methods of road-building in vogue at that time. One was the corduroy method, or the embedding of solid tree trunks in the road bed; the other was the plank-road method. The latter was adopted, and work was begun.

accumulated underneath, so that whenever a vehicle passed, a muddy fountain spurted up between the planks and deluged both goods and passengers. The end sleepers were accordingly dispensed with and the planks laid directly in the earth with the ends covered with earth. **Gravel Succeeds Plank**

This remained the favorite method of road-making until some one started the use of gravel.

Years before the expiration of the toll franchise on the main roads entering Detroit, the toll companies, to all intents and purposes, abandoned everything except the collection of toll; and since the traffic from the outlying districts converged towards Detroit, the nearer the city you got the poorer the roads were. In fact, during the late fall, winter and early spring months, they were impassable quagmires of clay and sand, with entirely inadequate drainage, wooden culverts and tumble-down bridges, merely pointing out a direction, and holding out in their sodden ruts and undrained surface the questionable consolation that somebody had previously passed that way.

The constitution of the state was amended in 1893, after which the county road law was adopted, making the county, instead of the township the unit for the building and maintenance of such principal roads as it may desire to adopt as county roads. In order to conform to public sentiment as it existed at that time, the law provided that it should be operative only in such counties as voted



SCARIFIER USED TO BREAK UP ROADWAY

The results were at first disappointing, owing to the manner in which the planks were laid. Stringers had been placed at either side of the road, and the boards, all of solid oak that would today be hard to match, even for interior finish, were spiked down. Under the heat of the sun they warped, and in wet seasons the water



GRADER THAT IS OPERATED BEHIND STEAM ENGINE



REPAIR PATROL OUTFIT CLEANING AND REPAIRING MACADAM ON GRAND RIVER ROAD

to adopt the county system. Numerous counties saw the benefits to be derived from building their roads under skilled and intelligent supervision, and quickly adopted the system. Not until 1906, after a campaign which had been carried on for years, was the question of adopting the county road system submitted to the people of Wayne county, at which time the proposition was carried by an overwhelming vote.

Unfortunately, however, for the success of the plan, some changes had been made in the law to fit conditions in Wayne county, and these changes started the unprogressives into action with resulting litigation. Before a rod of road was built, two injunction suits were fought and defeated; quo warranto proceedings were instituted against the commission appointed to carry out the provisions of the law. The commission contracted a debt of \$25 and upon being refused an audit, started mandamus proceedings to force the matter. The proceedings were carried to the supreme court on a writ of certiorari and the commissioners were ousted from office. Thereupon, the state legislature being then in session, was appealed to, and the law amended on the

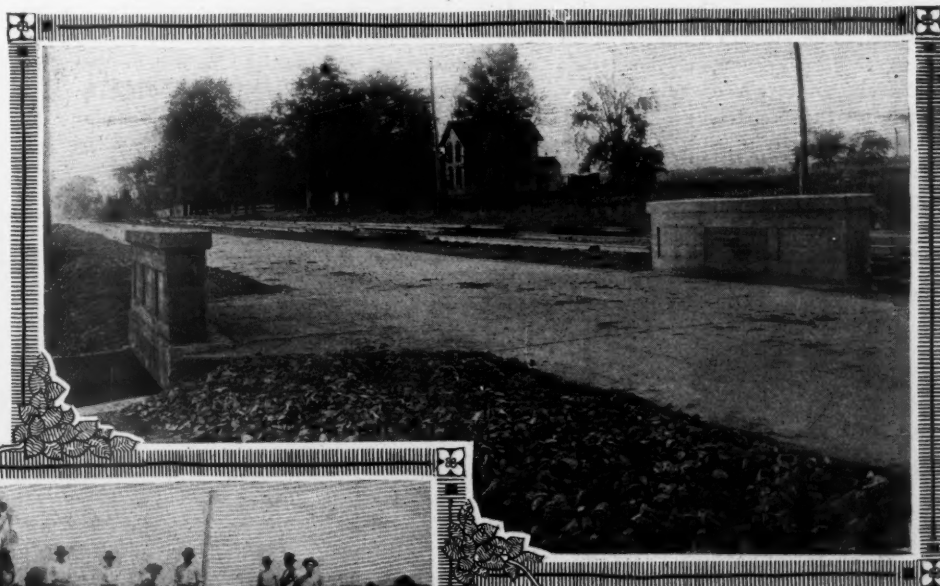
points where the supreme court indicated that it was weak or ineffective. Petitions were circulated asking for a special session of the board of supervisors, the legislative body of the county, which duly convened and appointed another board of county road commissioners. When this board attempted to carry out the provisions of the law it was again refused an audit of the first debt it contracted, and it again started mandamus proceedings.

Levying the Road Tax

By this time a year had passed, and it

was determined to make a fresh start by recommending that the first good roads tax levied be paid back and a new levy of $\frac{1}{4}$ mill be authorized by the board of supervisors, which plan was followed, the $\frac{1}{4}$ mill tax yielding a fund of about \$85,000. The following 2 years $\frac{1}{2}$ mill tax was levied and last year a $\frac{1}{2}$ mill tax. The results attained by the expenditure of these various sums were so conclusive, and such a sentiment was created, that the county bonded itself for \$2,000,000 to be spent in 5 years.

The initiative on this bonding proposi-



TYPE OF REINFORCED CONCRETE CULVERTS BUILT BY WAYNE COUNTY



CONSTRUCTING CONCRETE BRIDGE IN WAYNE COUNTY

tion was not taken by the county road board, but in its inception was fought by them because it was proposed to spend the whole amount in one year. A compromise finally was arranged on the basis of extending its expenditure over a period of 5 years. The concrete road was the great factor in bringing about such an overwhelming sentiment for large appro-

priations. I feel that had we continued building the various kinds of macadam and gravel roads which we started out to construct, with their high maintenance charges, their constantly forming ruts, their muddled up condition in the fall and spring months, and their general unsatisfactoriness, there would not have been created the sentiment which now exists.

Law a Powerful One

The farmers of the county road law wrote more wisely than they knew, particularly in the provision which gives the board authority to "grade, drain, construct gravel or macadam any road under their control, or place thereon any form of improvement which in their judgment may be best." We may also do the work ourselves or let it by contract. The phase of the law was especially valuable, as it permitted us to go ahead along new lines if we so desired, without the intervention or sanction of anyone who was opposed to a change merely because nobody else had ever done it that way before. Furthermore, by being able to do the work ourselves it was not slighted in any particular, and the experience of the Wayne county road commission is particularly valuable because we were not committed to concrete at the outset.

Detroit is the heart of the motor world, and the number of cars owned per capita is comparatively very high. This new vehicle quickly demonstrated here, as elsewhere, the purely temporary character of many so-called good roads. The motor car picked up the good roads in fine particles and scattered them over the countryside. The modern demands upon highways demanded new methods and new materials, and we used concrete.

Studying the Situation

As previously stated, the commission when first organized, followed the accepted practices and started in to build bituminous macadam roads; but after a year's experience in noting the wear upon



BEFORE TREATMENT—STICKY CLAY AND ALMOST IMPASSABLE

them, foreseeing a constantly increasing maintenance charge, and harking to the world-wide cry "What shall we do to save our macadam roads from the ravages of the motor car?" decided that a change was not only desirable, but necessary, and we set out to find a more permanent and durable material which would approximate in initial cost that of a first-class macadam.

After thoroughly investigating the subject, studying the experience of nearby smaller towns in the matter of concrete cross-walks, inspecting concrete bridge floors, and noting the general satisfaction concrete was giving in other forms of construction, the grades of materials used, the light form of construction as applied to cross-walks and bridge floors, we decided that a concrete road would come more nearly realizing the ideal than other forms. The points considered as being in its favor were: comparatively low first

cost; low maintenance cost; freedom from dirt—there being no detritus from a concrete road in itself—its comparative noiselessness; ease of traction for vehicles of all descriptions, and the small crown necessary to get rid of surface water. We crown our roads but $\frac{1}{4}$ inch to the foot which tends to distribute the traffic over a greater area of road, instead of following a defined wagon track such as usually exists on macadam and like roads, and which later means the development of ruts.

Early Experiments

While we were reasonably sure of our ground, we also felt that in case we scored a partial failure we could use the concrete for foundation purposes. Three stretches of road, aggregating 2 miles on varying subsoils, and with differing specifications were decided upon. Woodward avenue was selected for the first test, on account of the enormous and varying traffic it is called upon to carry. It is a continuation of the principal main paved retail street of Detroit, leading to the state fair grounds, Palmer park, a popular playground, two large cemeteries and to Oakland county a rich farming section, whose hills and gravel roads combine to make a very popular and much traveled motor drive.

The subsoil is of a gravelly nature. A specification was devised for a concrete road in two courses, the bottom course of a 1-2½-5 mix 4 inches deep, of limestone; and a top or wearing course of 1-2-3 mix of crushed cobblestone 2½ inches deep, the whole being laid in section of 25 feet, with varying forms of expansion joints. No more than 20 minutes were allowed to elapse between the laying of the two courses, so that a true bond would be effected between the bottom and the wearing course. The metal was 17 feet 8 inches wide, with a minimum width between ditches of 24 feet. Suburban trolley tracks occupy one side of the road, which



MICHIGAN AVENUE ROAD, WITH COUNTY POOR FARM IN DISTANCE



SAME WAYNE COUNTY ROAD AFTER IT WAS CONCRETED

is drained by 3-inch land tile laid between the rails and the concrete, and the other side by an open ditch.

The second experimental road was built on a sandy foundation of a 1-2-4 mix of washed pebbles ranging in size from $\frac{1}{8}$ to $1\frac{1}{2}$ inches, and washed sand from $\frac{1}{8}$ to 0, built in one course 6 inches deep. The third stretch was built on clay, with specification similar to the one used on Woodward avenue road.

In coping with the expansion we used several kinds of experimental joints. Two thicknesses of three-ply tar paper were used in some sections; a southern pine board $\frac{1}{2}$ inch wide was used in other sections; a composition of asphalt, still wax, and pitch was tried in still other sections; and in still others the edges were protected by an angle iron embedded in the concrete, and the space between adjacent sections filled in with composition.

These roads are starting on their fourth year of wear and barring some longitudinal cracks are as good as the day they were built, and practically nothing has been spent on their surface for maintenance. On the basis of 3 years thorough trial, I stand committed to the use of concrete for country roads. I also believe concrete to be an ideal form of paving for villages and city residence, streets and alleys. This is not a statement born of enthusiasm on the spur of a moment, but a cold-blooded dollars and cents view, based on results attained and arrived at after careful consideration of all the facts available and experiences undergone.

Plans for This Year

This year, providing we can obtain sufficient materials to carry on the work, we will build about 40 miles of concrete. In addition thereto, we are planning to spend by far the largest part of the \$2,000,000 bond issue for concrete roads, and expect to get \$2,000,000 worth of value for the money expended.

It is to be expected that on our first

experimental work we did not achieve perfection. We did not use the same care as we are today exercising in the selection of a clean aggregate or a good mix. Neither were we so careful about striking off and finishing the surface. I believe I am safe in saying that the concrete roads we are building today are 25 per cent better than our first efforts. We have abandoned entirely the construction of two-course roads built of crushed cobblestone, because of the difficulty of securing a suitable supply of properly graded material of this character. Crushed stone also contains a greater percentage of voids to be filled.

Improvements Made

We also have devised numerous other improvements in our method of construction, and in our specifications, which we believe will add materially to the life of our concrete roadways, and to the enjoyment of those who use them. Among the more important changes have been:

1—The increase in the amount of cement used in our mix, changing from a 1:2:4 to a $1:1\frac{1}{2}:3$ mix.

2—A more stringent specification as to quality of stone and sand, especially with relation to its freedom from clay, loam, and other foreign substances.

3—An increase in the depth of the work from 6 and $6\frac{1}{2}$ inches to not less than 7 inches.

4—A protecting plate at the expansion joint.

Angle Iron for Joints

Three years ago we tried an angle iron on several expansion joints on Woodward avenue road, and the results of this experiment were so satisfactory that on most of the roads built this year we have adopted a similar device, which is really a development of this angle iron idea, viz.: a soft steel plate $\frac{1}{2}$ inch thick, 3 inches wide provided with shear members which tie it securely to the concrete base and wearing surface. These plates are clamped to a dividing board shaped at the top to conform to the crown of the finished road, and two thicknesses of three-ply asphalted felt—about $\frac{1}{4}$ inch—cut the entire depth of the concrete and inserted between the plates. By the use of the above device we have materially strengthened the weakest part of a concrete road, as it largely removes the possibility of wear at the joints, resulting in an even and uniform surface. While these joints are more expensive than the ones formerly used, we consider the additional expense a good investment. For 1912 we again have changed our specification by providing a contraction joint of the above plates to extend longitudinally through the center of our roadways by which means we hope to eliminate all cracks.

Wayne county is poor in good road material, and practically all the stone and sand we use has to be shipped in. The county is flat and therefore, not so easily drained, and the subsoil is largely clay or



FORT ROAD, CONCRETE AND WITH A BITUMINOUS WEARING SURFACE

sand. We prepare and shape our subgrade, rolling it hard with a 10-ton roller, and lay the concrete right on the natural subsoil. Side rails of 2 by 7 inch lumber are used; and these are protected on top by a 2-inch angle iron. When the concrete has become sufficiently firm to permit the removal of the rail, the finishers pare off the outer edges which are formed next to the rails, to prevent a sharp division line between the concrete and gravel shoulders.

Our trunk roads are built 16 feet wide with gravel or limestone shoulders 4 feet wide with a minimum width of 24 feet. We also have built concrete roads of 9, 12 and 16 feet.

Laying the Concrete

When first put down the concrete is thoroughly tamped in place and when this is done no workman is permitted in any way to disturb the concrete by stepping in it or throwing anything on it. The strike-off men use a plank trimmed to the curvature of the road and iron bound on the edges. It rides smoothly on the iron edges of the form boards or rails at the side of the concrete, and is handled with sufficient care to eliminate the necessity for any considerable floating by the follow-up man.

These floaters work on a bridge which rests on the form planks at the edge of the road so there is never any contact with the concrete. This rule to keep off the concrete is rigidly enforced. Smoothing is done with simple wooden floats of home manufacture.

Each days work is finished up to an expansion joint and no more than 20 minutes is permitted to elapse between batches during the day. The work of the day is covered with canvas and the next day the canvas is removed and the concrete covered with any sand or loose soil that may be available to the depth of about 2 inches to keep the concrete from drying out. The concrete is sprinkled several times daily for 8 days. Roads are not opened for traffic until at least 2 weeks after the last concrete is in place. The gravel shoulders are put on in two layers, and rolled with a 10-ton roller. This work is not started until the adjacent concrete is at least 3 weeks old.

Machinery is used wherever the same or a better result can be secured, and it is a unique spectacle to see the large hauling engines of the commission steaming ahead of from two to four large wagons, each loaded with 7 tons of stone. Graders also are drawn by steam, doing the work of six to eight horses, more efficiently and more rapidly. Old roads are rooted up with a scarifier or gang plow. Water is pumped for miles by gasoline engines; and many smaller economies and labor-saving devices designed by the commission or its employees are in use. Cement is mixed in a mechanical batch mixer that moves under its own power, and from which a boom projects, capable of being swung in the arc of a semi-circle.

Rumored Merger a Reality

Combination of Interests of C. F. Splitdorf and John F. Alvord Results in Incorporation of Splitdorf Electrical Co.—New Concern Will Make Magnetos, Coils and Spark Plugs

NEW YORK, May 21—With the formation of the Splitdorf Electrical Co., duly incorporated under the laws of New Jersey, with a paid-in capital of \$3,500,000 and the election of John F. Alvord as president and C. F. Splitdorf as vice-president of the new concern, as mentioned last week in Motor Age, the rumored merger has become a reality.

The company under its new name is a new organization with a stock issue divided into \$1,500,000 of 7 per cent cumulative preferred shares and the balance of \$2,000,000 of common stock, with John F. Alvord, acting for the Torrington Co. of Torrington, Conn., as direct sponsor for the new corporation. The interests of C. F. Splitdorf, Inc., in the ignition field are absorbed in the new company, with the object of enlarging the present business of the old house of Splitdorf.

Mr. Alvord, whose intimate connection with the Torrington companies producing motor cycles, bicycles and motor cycle supplies, and other organizations connected with motor car supplies, brings with him into the new concern several men who are identified with his enterprises. Bryant S. Keefer has been elected treasurer of the

Splitdorf Electrical Co. and Carlos W. Curtiss is secretary and general manager. The board of directors consists of John R. Viles, John F. Alvord, C. F. Splitdorf, Bryant S. Keefer, and Carlos W. Curtiss.

No radical changes will be made in the ignition business built up by C. F. Splitdorf and with which he continues his interests. Facilities for increasing the present output of magnetos, coils and plugs are being studied by the new organization and plans for the furtherance of manufacturing efficiency are under way, according to Sidney S. Meyers, who is acting for the interested parties of the corporation.

REPUBLIC TO APPEAL

Youngstown, O., May 21—That the Republic Rubber Co. will continue litigation in the staggard tread suit, in spite of the fact that the United States circuit court of appeals reversed the decision granted in its favor, is evident from a general letter sent out today to the Republic's branch managers. The company states it believes that the decision does not invalidate its patent, except as to the single claim which was involved in the Morgan & Wright suit, and does not affect the patent so far as it covers the staggard-tread arrangement and general appearance of the tire.

Probably the Republic company will litigate the case further, as it is hopeful of a different final outcome on the particular points involved between it and Morgan & Wright. It is stated that it will be the disposition of the Republic company immediately to prosecute the suits against any makers of tires in imitation of the staggard patent, contrary to the other claims of the patent.

EASTERN LITIGATION

New York, May 21—Suit has been entered on behalf of the Rose Mfg. Co., in the United States district court, alleging infringement of the Rosenbluth patent on license plate holders and directed against the following named defendants: Emil Grossman, Emil Grossman Co., Eclipse Specialty Co., National Sales Corporation, Motor Car Equipment Co., Gus Balzer Co., American Auto Supply Co. and the Lowe Motor Supplies Co. The suit is said to include some additional allegations, extending farther than the former actions brought by the Rose company, which were recently dismissed.

Unfair competition was the main allegation of the complainant in the suit of the Rushmore Dynamo Works against the Badger Brass Mfg. Co., which was heard by the United States circuit court of appeals on Monday. The validity of no patent is

The mixed material is dumped into a bucket which is run out on the boom and deposited on the road where it is wanted. Each batch of concrete is turned over three complete revolutions dry before the water is added. A wet mix is used.

Hauling materials to the road to be used, as the mixer and gang work backwards towards the base of supplies, is done with considerable nicety, so that it is usually unnecessary to haul in extra sand or pebbles to make a properly proportioned batch.

The concrete roads in Wayne county have cost from \$1.04 to \$1.75 per square yard complete. The figure varies with the cut and fill required in grading, the price of materials, which varies at different railroad sidings, and the length of haul for materials. The figures given include the cost of concrete culverts, concrete tile drains, land tile along the street car tracks, open ditches, grading, and the earth or gravel shoulders. Yardage is figured on the concrete only; the cost of shoulders, etc., being apportioned over the concrete yardage and added to its cost.

During the year just closed less than \$200 was spent for maintenance on about 30 miles of concrete road, and this money was used practically for cleaning our ditches and trimming up the shoulders, and not on the concrete surface itself.

Colt Tells Rubber Plans

U. S. R. Co. Meeting Votes to Increase Capital Stock to \$120,000,000—Dividend of \$5,000,000 to Go to Present Stockholders If Scheme Is Accepted by Them

directly involved in the action, the suit being based upon the alleged course of the defendant in imitating the flarefront lamp pattern characteristic of the Rushmore product.

SEWELL GIVEN DYER LICENSE

New York, May 20—Bert W. Sewell, representing the Minerva Motors Co., the importing house in New York for the Minerva car, was granted a sweeping license by the Enterprize Automobile Co. of Hoboken, N. J., authorizing the licensee to import and sell the product of the European factories. The license is framed in terms similar to those already granted companies having more than a local patronage and provides for a royalty of 1/4 per cent of the selling price of the cars for the use of the Dyer transmission and motor car patents.

DORIAN STATEMENT FILED

New York, May 20—Schedules in bankruptcy on behalf of Moritz and Max Rosett, owners of a string of banking houses and the chief financial backers of the Dorian Removable Rim Co., have been filed in the United States district court. The schedules show liabilities of \$746,223, of which \$603,121 are unsecured. Nominal assets are placed at \$943,645. The list shows 11,000 shares in the Dorian company, valued at \$35,000. Progress toward an adjudication of the difficulties of the Dorian company has been slow, as there is a reported prospect of the outright purchase and rehabilitation of the company.

UNIVERSAL MAY MOVE

Milwaukee, Wis., May 21—It is stated on excellent authority that the Universal Motor Truck Co. of Detroit, Mich., has arranged to move its big works to Milwaukee by July 1, 1912. The removal is said to be the result of the efforts of the big interests controlling the Joseph Schlitz Brewing Co. of Milwaukee, also heavily interested in the Universal company and other companies of which Walter E. Flanders is the active head. The decision to move followed the reported recent merger of the Flanders interests with the Metzger Motor Car Co. of Detroit. The Universal company is capitalized at \$1,000,000 and employs from 2,000 to 2,500 men. Nothing definite is known as to the exact location of the new works in Milwaukee.

CAMERON JOINS MICHIGAN

Kalamazoo, Mich., May 20—W. H. Cameron, formerly Overland engineer, has joined the engineering staff of the Michigan Buggy Co. Mr. Cameron is one of the oldest engineers in the motor industry.

NEW YORK, May 22—Special telegram —Financial plans of the United States Rubber Co. for the immediate future were outlined yesterday afternoon at the annual meeting of the company at New Brunswick, N. J., by Samuel P. Colt, president. The president reported that the company found it desirable to increase its cash capital by \$10,000,000 to finance manufacturing extensions and to increase production.

The plans suggested call for an increase in the total authorized capital stock from \$75,000,000 to \$120,000,000. This will be divided into \$40,000,000 common and \$80,000,000 preferred. The increase will be represented by \$15,000,000 common and \$30,000,000 preferred. The distribution may be as follows:

A dividend of \$5,000,000 of the new common stock to present stockholders which would be at the rate of 20 percent of their present holdings. Ten million dollars of first preferred to be offered ratably to all stockholders at par and accrued dividend. To submit an offer to the holders of the present second preferred issues to exchange their stock for the new first preferred on a basis of 100 shares of the existing second preferred for seventy-five shares of the new first preferred.

It is understood that \$2,500,000 of the new first preferred will be offered to minority stockholders in the rubber goods manufacturing company, the holding company, controlling the stocks of numerous automobile tire companies.

Informal vote will be taken on the proposed plan by the stockholders on May 31.

Refunding of all existing obligations of the main and subsidiary companies is contemplated. Wall street looked for the announcement of a \$50,000,000 bond issue after the meeting and such an announcement after the vote has been taken would surprise nobody.

AVERY PATENT UPHELD

Milwaukee, Wis., May 22—Judge Sanborn of the United States court has sustained P. C. Avery's patent covering electric motor car lamps, and declared the Milwaukee Bronze Casting Co. an infringer. An interlocutory decree against the Casting company has been issued.

U. S. AFTER ALUMINUM CONCERN

Pittsburgh, Pa., May 20—Civil suit to restrain the Aluminum Co. of America from monopolizing the manufacture of aluminum and its products has been filed in the United States district court on behalf of the government. The government does not ask for dissolution of the corporation, but petitions for nine broad in-

junctions against as many alleged unlawful practices. The government admits that the company's control of 90 per cent of the known deposits of bauxite is not unlawful but objection is made to the methods charged against the company in killing off possible competition, especially since 1909, when the patents on the process of manufacture expired by limitation. The company has \$27,000,000 capitalization.

RUMOR CADILLAC WILL MOVE

Toledo, O., May 18—Persistent rumors of the removal of the Cadillac company to Toledo are being circulated here, the latest being that of a purchase of ground at Rossford by the Cadillac company, presumably for the purpose of erecting a plant. No verification of the rumor could be had here.

SMITH PLANT FOR SALE

Topeka, Kan., May 21—Despite recent attempts to organize a new company to take over the plant of the old Smith Automobile Co., it is again on the market. It was purposed to assemble the parts of the Great Smith cars on hand at the factory, then build a new line of cars, but difficulty was encountered in securing sufficient subscribers for the stock. The plant now is in the hands of the receiver of the old company.

MOLDERS' CASE POSTPONED

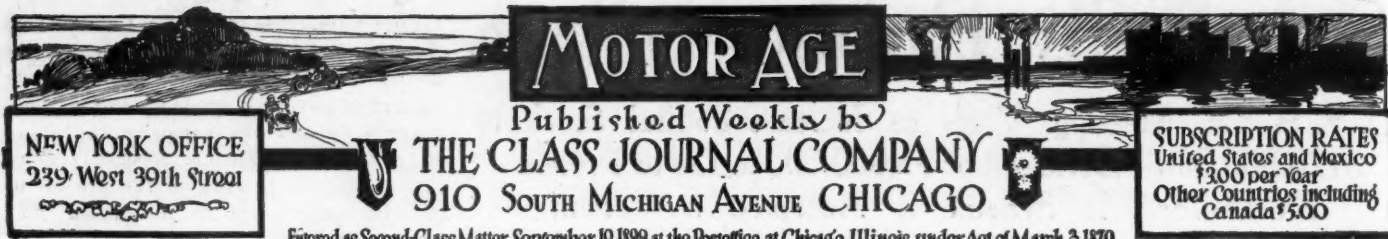
Buffalo, N. Y., May 21—Judge Hazel of United States district court has postponed until Saturday, May 25, the hearing in the case of the members of local No. 84, International Molders' Union of North America, on the charge of contempt of court in the alleged violation of the temporary injunction issued by the court restraining them from interfering with the business of the Aluminum Castings Co.'s plant in Elmwood avenue, where a strike of coremakers and molders has been in progress for 2 months.

LOCOMOBILE BOND ISSUE

New York, May 20—The Locomobile Co. of America has issued \$1,500,000 of 10-year 6 per cent sinking fund bonds for refunding and extending manufacturing operations. The company has enjoyed a remarkably successful season so far and the manufacturing has been on a larger scale than ever before. The company already has outstanding \$1,000,000 of debentures, \$1,500,000 7 per cent preferred and \$4,750,000 common.

AGENT SUES WOODS ELECTRIC

Chicago, May 18—The Woods Motor Co. of Minneapolis has brought suit against the Woods Motor Vehicle Co. of Chicago, in the Minnesota courts for \$23,000, alleging that the latter did not live up to its guarantees. According to the Woods Motor Vehicle Co., the Woods Motor Co., of which R. H. Magoon is president, was Minneapolis agent for Woods electrics until last January, and the suit is the result of a slight difficulty in adjusting back commissions.



MOTOR AGE
Published Weekly by
THE CLASS JOURNAL COMPANY
910 SOUTH MICHIGAN AVENUE CHICAGO

NEW YORK OFFICE
239 West 39th Street

SUBSCRIPTION RATES
United States and Mexico
\$3.00 per Year
Other Countries including
Canada \$5.00

Entered as Second-Class Matter September 19, 1899, at the Postoffice at Chicago, Illinois, under Act of March 3, 1879

Planning the Summer's Touring

THESE are the days when the motorist is vaguely planning his summer tour, or if he is not so fortunately situated as to be able to take a week or so and mix with nature and see the beauties of the country, then he is planning on a series of short week-end trips that will tide him over the summer and early autumn months and invigorate him for the next cycle of late fall, a long winter and a long spring in the business office. This planning work is the secret of success, even in touring. The motorist who does not plan rarely accomplishes. The warm months take to themselves wings and it is bewildering how fleeting is their passage. Taking time by the forelock is the only insurance of actually getting to making a trip anywhere.

THE laying out of a tour should be done several weeks before the start of the trip. This is imperative. Many a hastily-prepared trip has been robbed of its pleasure because the tourists found the roads in the section traversed were torn up for repairs or recently covered with miles of rough stone which made the trip anything but pleasant. They found that the main routes they had intended to follow entirely closed and further found the detour routes over very poor roads. The trip was further discounted by missing not a few of the scenic or historic spots that they had originally counted as important points in their itinerary. This can be guarded against. There are in the country many organizations that will give any tourist information on through routes such as he may require, and Motor Age expects to publish from week to week all of the information it can obtain on this matter. Throughout many sections of the country the Touring Club of America, through its headquarters and its many branches, is doing excellent work in this matter; the American Automobile Association has its touring departments; the Automobile Club of America has such information for parts of New England and territory adjacent to New York; and in a score or more of states, through which the motorists have been able to establish cross-state routes, such information may be obtained from the secretaries of the road organizations. Scattered over the country are scores of motor clubs, and dealers' associations, many of whom conduct route and touring information departments of more or less prominence and from them it is always possible to get much road condition information. No matter how obtained the motorist should before starting fortify himself with such road conditions so that he is assured of those pleasures that should be his so far as roads are concerned.

IN the touring season hotel accommodations is a problem to be reckoned. Everybody wants to get to the same place at the same time. The season in the mountains is a brief one; that at the popular seaside resorts is equally brief, and the tourist who reaches his hostelry at 6 or 7 o'clock in the evening without having made any previous arrangements for himself and party is generally more or less disconcerted at paying a high rate and having quarters in the attic or in some of the most inferior portions of the hotel. He pays the price of the best accommodation and gets the poorest. The fault is not the hotel man's but his own. A definite plan of his itinerary arranged a month in advance and a few letters making hotel reservations will serve as the keystone in the chain of arrangements that must be made for every tour which is to give that pleasure which it should.

IN planning a route there are many different ways of proceeding. Frequently the tourist will consult with some friend who has spent 2 or 3 weeks of a previous season in certain sections, and from him he is not only able to secure the general daily itinerary, together with a list of well recommended hotels, but also information on road conditions as may be expected, prices, and many other local customs that are often confusing and more or less disturbing during a trip. To the tourist who is not so fortunate as to get his recommendations from friends who have been over the ground, there is nothing better than to buy accredited route books such as the Automobile Blue Books which cover the entire country; which give town to town directions in through routes extending from the Atlantic to the Pacific, so that the tourist can make such a trip without having to lose time and running the danger of getting incorrect directions from local citizens who are familiar with but insignificant distances when the length of the entire trip is in mind. Not only do these books give through route information for the different divisions of the country, but they contain hundreds of intercity routes in such localities as New England, New York State, Pennsylvania section, the southern section, the central west, the west, and the Canadian section. With these it is possible for the tourist to arrange an itinerary no matter how complex or intricate, being brought up to date year by year can be depended upon in every respect. Frequently, however, there are many who want to get off the beaten paths, when on a holiday tour, and to these there is open the almost endless volumes of information under the control of the different organizations already referred to.

LASTLY in the matter of a tour comes the car, and to which credit it must be said that with the advance design and accurate workmanship of the American factory the machine has come to be one of the least disturbing factors in a tour of this nature. The bugbear of changing tires has been entirely eliminated by the quick-detachable rim devices, by the introduction of demountable rims, to which might be added the present advent of demountable wheels. So adequate are the lubrication features of the modern motor that it is possible to travel from 200 to 500 miles with many cars without having to replenish the oil supply. Gasoline is now a commodity almost as universal at the village and cross-road store as sugar or tea, and so there is scarcely a section of the country where the 150-mile gasoline capacity of the car is not adequate for the most extreme situation. The car as a touring vehicle has been further fortified by the general development of the service idea throughout the most remote parts of the country. All of the best makes of cars are now so generally represented throughout every state by dealers or branches where complete supply parts are carried in stock as to make it possible to have any of the normal breakdowns in machinery corrected by replacing new parts with a loss of little more than half a day. The rural telephone has made it possible for the tourist in an emergency to get into contact with garages that may be but a few miles distant, to get in communication with the dealer or even with the factory itself within an hour after the occurrence. So great has been the evolution in all of these allied facilities that touring today is entirely robbed of those nightmares that characterized it a few years ago. Today touring is up to the car owner.

Boom Conditions Reported in Detroit

DETROIT, MICH., May 20.—Boom conditions prevail with respect to the motor industry. Things are simply humming and the local dealers are getting their full share of business, to judge by the number of new cars seen on the streets. Out in Pontiac the same conditions are reported. Four Pontiac factories will turn out 1,600 cars the coming month, representing a value of \$2,000,000. Of these the Oakland company alone will turn out 1,000. The other companies are the Cartecar, Rapid and the Flanders. The Detroit branch of the Buick Motor Co. announces that the allotment of model 28 roadsters and model 29 touring cars has been sold. All orders on the books at the Detroit branch will be filled prior to June 1.

King Running Day and Night

The King Motor Co., now located in its new factory at 1300 Jefferson avenue, is running day and night in order to fill orders and its production plans have been greatly increased.

The Cadillac Motor Car Co. last Tuesday shipped its 10,000th car of the 1912 model, bringing the total number of cars produced by the Cadillac company to 51,000. Of this number more than 35,000 were of the four-cylinder type.

Pratt, Carter, Sigsbee & Co. will establish in the near future a large plant for the manufacture of a truck to be known as the Wolverine. It is a single-cylinder affair with a capacity of 800 pounds.

Ground will be broken in a few days, it is stated, for a new car factory at Woodward and Lothrop avenues, just north of the boulevard. This will be the home of the Century electric, in which enterprise several well-known Detroiters are interested. John Wynne is president and John Gillespie, of the Gillespie Auto Sales Co., general manager. The building will be 105 by 200 feet and of brick and steel construction.

New Electric Car

J. G. Phipps, of 45 Baggs street, has brought out an electric car with some distinctive features which will be manufactured in this city as soon as the organization of a company can be perfected. Associated with Mr. Phipps in the enterprise is C. W. Whitson, one of the men who organized the Krit Motor Car Co. The new car has a 107-inch wheelbase.

There have been several changes in the sales department of the Studebaker Corporation's motor car division as a result of the resignation of Paul Smith and the appointment of Mr. Benson. The changes are not confined to the sales department, either, for among those who are leaving the company is L. R. Acton, general auditor and assistant treasurer, who came here from South Bend. It is rumored that he will be the new treasurer of the Metzger Motor Car Co. Frank Smith, who was

Local Dealers Selling Cars and Makers Busy Filling Orders—Trade Gossip

first assistant to Paul Smith at the E-M-F has also resigned and it is said that he, too, will be identified with the Metzger company, probably in the sales division. H. W. Miller has resigned as chief clerk in the Studebaker sales department to join the sales force of the Metzger. Other changes are in the air.

Stoddard Selling U. S. Stock

A local financial writer, in commenting on the softening of United States Motors stock during the past 2 months, attributes this condition to unloading operations by Charles G. Stoddard, formerly one of the vice-presidents of the company, but who is no longer connected with it. Most of the stock sent to the head offices for transfer bears Stoddard's name, he says.

In this connection it is reported that the company's sales for the 6 months to Janu-

ary 31 were 30 per cent greater than for the corresponding period the previous year. It is estimated that the profits for the year will be at least \$2,000,000. All the factories are running full time and have orders ahead. The company is discounting its bills and its general financial condition is said to be good.

Within 90 days, according to present plans, the Parish Mfg. Co., of Reading, Pa., will have in operation in this city probably the largest motor car frame manufacturing plant in the world. The company, through Charles M. Hall, its sales manager, who spent several days here last week, has closed a deal for the purchase of the Seamless Steel Bathtub Co. plant at Mt. Elliott and Harper avenues. It will add several new buildings at once and install modern machinery and equipment throughout. The property lies directly in the rear of the Packard plant, this being one of the companies the Parish concerns supplies with frames. From this plant the company will also supply makers in Indiana, Illinois, Ohio and western New York. The Reading works will continue in operation.

Canadian Change

G. E. Lindsay will be succeeded June 1 by F. E. Fisher as manager of the Studebaker Corporation of Canada, Ltd. Until May 7 the Canadian concern was known as the E-M-F Co., Ltd.

Following a recent visit of Horace de Lissier, vice-president of the United States Motor Co., it is announced that hereafter local sales of Sampson trucks will be handled direct from the factory instead of from New York. J. V. Carr will be in charge. Provisions have been made for a semi-monthly inspection of all Sampson trucks now in use here and to be sold hereafter.

POLICE PICKING UP TAGS

Philadelphia, Pa., May 17—Motorists will be aided by the police in the recovery of lost motor car license tags by an order of Superintendent of Police Taylor to the effect that in the future policemen finding tags will forward them immediately to the detective bureau in the city hall, where they will be held until claimed. It has been the custom to return lost tags to the police station of the district in which found, which oftentimes caused considerable delay and inconvenience in their recovery.

STOCK CAR RACE FOR ENGLAND

London, May 11—The Royal Automobile Club has announced that it intends to hold a standard car race at Brooklands. No date has as yet been fixed, but it is probable that it will be within the next month. This race, it is expected, will be conducted very much as was the successful standard race of last year.

Coming Motor Events

- May 30—Hill-climb; Automobile Club of Danbury; Danbury, Conn.
- *May 30—Indianapolis speedway, 500-mile race; Indianapolis, Ind.
- *May 30—Track meet, Rockingham park; Salem, N. H.
- May 30—Track meet, Washington, D. C.
- June 6—Reliability run; Washington Post.
- *June 8—Track meet; Quaker City Motor Club; Narbeth, Pa.
- June 15—Track meet; Belmont Motor Club; Narbeth, Pa.
- *June 20—Algonquin hill-climb, Chicago Motor Club; Algonquin, Ill.
- *June 20-22—Reliability run, Pine Tree Motor Contest Association; Portland, Me.
- June—Reliability run; Auto Club of St. Louis, St. Louis, Mo.
- June—Hill climb; Maine Automobile Association; Portland, Me.
- June 27-28—Interclub match, Chicago Athletic Association and Chicago Athletic Club.
- June—Track meet; Baltimore, Md.
- June 27-29—Summer meeting Society of Automobile Engineers; Detroit, Mich.
- July 4-5—Track meet; Taylor Automobile Club; Taylor, Tex.
- *July 4-6—Beach meet; Old Orchard Automobile Association; Old Orchard, Me.
- July—Reliability run; Maine Auto Association.
- July—Reliability run; Cleveland News.
- July 4—Track meet; Petersburg, Ind.
- July 5-6—Road Race; Montamara Festo Auto Com.; Tacoma, Wash.
- July 10-20—Canadian Industrial Exhibit; A. C. Emmett, manager motor section; Winnipeg, Can.
- July 15—Reliability run; Wisconsin State Automobile Association; Milwaukee, Wis.
- July 22-27—Cadillac celebration at Detroit, Mich.
- *August 8-10—Galveston beach meet; Galveston, Tex.
- *August 23-24—Road races; Chicago Motor Club; Elgin, Ill.
- *September 2—Speedway meet; Indianapolis, Ind.
- *September—Commercial vehicle run; Chicago Motor Club.
- September 17-20—Fire engineers' convention; International Association Fire Engineers; Denver, Colo.
- Sept. 23-Oct. 3—Rubber show, Grand Central palace, New York.
- *October 7-11—Chicago Motor Club reliability run; Chicago.
- *Sanctioned by A. A. A.

Goodrich Purchase Awaits Final O. K.



DIAMOND PLANT ON LEFT AND GOODRICH FACTORY ON RIGHT

AKRON, O., May 20—The finishing touches will be made here Monday, May 27, at noon, in the sale of the Diamond Rubber Co. plant to the B. F. Goodrich Co. A meeting of the stockholders of the Diamond company has been called for that date to approve of the transfer of the Diamond property to the Goodrich company, thus completing the biggest rubber deal ever made and giving to Akron the largest rubber plant in the world.

In discussing the purchase of the Diamond plant B. G. Work, president of the Goodrich company, said this week that the holders of each share of Diamond stock will receive twenty-seven shares of Goodrich common stock, one share of Goodrich preferred stock and \$55 in cash. **President Work Interviewed**

"They will receive \$75 worth par value of preferred stock and \$80 in cash, but will be permitted to devote \$25 of the cash to the purchase of preferred stock at par," said Mr. Work. "Of the cash to be received \$5 is in a cleaning up of profits. The New York bankers report by telephone that they have closed the subscription books for all the common and preferred they had to sell."

"Will the Goodrich company shortly increase its capital stock to \$150,000,000 instead of \$90,000,000?" Mr. Work was asked.

"There is nothing in that, or in the reports that we contemplate taking in other rubber companies," replied Mr. Work. "The new Goodrich company, as now contemplated, will be the old Goodrich and the Diamond companies and no others."

Since the sale of the Diamond to the Goodrich company there have been many rumors that sweeping changes will be made in the selling organization of the new company. This is denied by President Work.

"At the present time," says President Work, "there is no change contemplated in the selling organization of the Diamond or the Goodrich companies."

Stockholders Asked to Approve Details Next Monday —Plans for Future

Another of the rumors has been that nearly all of the Diamond branches or agencies throughout the country are to be discontinued. This is denied by President Work. "We will maintain the branches of both companies," said he, "but eventually they will be amalgamated in each city into one branch."

In discussing the future of the Goodrich company President Work said: "The name Diamond will continue as a trademark, as also will the Goodrich. Both Goodrich and Diamond tires will be marketed in the future as in the past. As to the rumors that the Goodrich company is to make many changes in its marketing force I will say that there are to be no special changes. We propose to double our marketing force. The entire office force of both companies also will be retained."

The new company is to be known as the B. F. Goodrich Co. It will be the largest rubber plant in the world, having a capital of \$90,000,000 and a working force of 9,000 people in Akron alone. The Diamond company is now employing 4,000 and the Goodrich 5,000. At the present time the monthly payroll of the Goodrich company is \$400,000, while that of the Diamond is \$300,000. The monthly payroll of the new company will be \$700,000.

Goodrich History

The Goodrich company was organized in 1869 and the first actual rubber products were placed on the market a year later. Twenty-five people were employed by the Goodrich company at the start and the first year's output of the factory amounted to \$49,403. Several times, in the early years of the history of this company, there were fears of financial disaster, but in recent years many men have walked out of the plant millionaires. The growth of the Goodrich company is best understood by a statement just issued showing

the profits and gross earnings of the company during the past 4 years.

Year ending	Profits	Gross sales
Dec. 31, 1908....	\$2,793,433.12	\$13,815,914.38
Dec. 31, 1909....	3,433,548.75	18,605,238.04
Dec. 31, 1910....	1,605,254.10	23,806,578.76
Dec. 31, 1911....	3,992,592.03	27,406,732.53
Real estate, buildings, plant, machinery, goodwill, patents, etc.		
Investments in other companies:		\$36,787,922.07
United Rim Co....		\$ 5,000.00
Akron Rubber Shoe Co.		800.00
O'Sullivan Rubber Heel Co.		75,000.00
Philadelphia Rubber Works.....		526,750.00
Societe Francaise—B. F. Goodrich (fcs. 2,500,000.00 @ 5.15).....		485,436.89
		1,092,986.89

Current assets:	
Inventory of materials and supplies, goods in process and finished product valued at approximate cost....	\$9,282,889.59
Accounts receivable—trade accounts less reserves for bad debts, discounts, etc.....	2,199,994.56
B. F. Goodrich Co., Limited, London: Suspense account.....	\$86,419.85
Thread account.....	39,089.42
Paris branch.....	125,509.27
Societe Francaise, B. F. Goodrich.....	17,772.48
Akron Rubber Shoe Co.	291,109.81
Miscellaneous receivable.....	617,271.44
Bills receivable.....	109,161.56
Cash in hand and at bank.....	165,108.60
	473,203.95
Deferred charges to future operations.....	13,282,021.26
	124,660.90
	\$51,287,591.12

Capital Stock:	
300,000 shares of common stock of \$100 each.....	30,000,000.00
150,000 shares of 7 per cent cumulative preferred stock of \$100 each.....	15,000,000.00
(Redeemable in case of dissolution, liquidation, merger or consolidation at \$125 per share.)	
Surplus—Current Liabilities:	
Bills payable.....	\$2,400,665.23
accounts payable....	465,437.62
Sundry accruals....	89,858.51
B. F. Goodrich Co. of Ohio.....	937,684.98
	3,893,646.34
Miscellaneous reserves.....	393,944.78
	\$51,287,591.12

It is said that if the Diamond company's report were known it would contain just as remarkable figures.

Danger Apprehended in Patent Bill

The Diamond company was incorporated about 15 years ago, giving employment at first to but 250 men. Among the pioneers in this plant were W. B. Miller, A. H. Marks, W. B. Hardy and A. H. Noah. Its growth has been almost as remarkable as that of the Goodrich. The Diamond group consists of twenty-five buildings and the twenty-sixth is now under way of construction. It will be 160 feet wide and 267 feet long. The estimated cost is \$190,000. It will be used for tire manufacturing purposes. A tenth of the population of Akron is employed in these two plants.

ENGLISH PATENT REPORT

Washington, D. C., May 20—There were 29,353 applications for patents filed in 1911, as compared with 30,388 in 1910, according to Consul General John L. Griffiths, in his official statement on British patents, in the Daily Consular and Trade Reports. Of this number 2,670 applications for patents were from residents of the United States. Although this report shows a falling off of more than 1,000 patent applications, Consul General Griffiths states there was an increase of over 10,000 applications for designs in 1911 as compared with 1910. The trend of invention for 1911, according to the consul general, shows that "the ever-increasing importance of means of locomotion to the community in general is demonstrated by the prominence this subject takes under an analysis of the whole field of inventive activity. The internal-combustion engine is greatly in evidence, particularly in connection with the revolving cylinder type and the so-called valveless engine, in which poppet valves are dispensed with. Wheels for vehicles are a still more prolific source of invention. Motor vehicles and motor cycles maintain their claim to attention, variable speed gearing, clutches, and engine starting devices being especially noteworthy. * * * Increasing attention is being given to the utilization of the gyroscope in its use as an anti-skidding device for vehicles."

New York Tradesman Points Out What Might Happen if Measure Passes

WASHINGTON, D. C., May 20—House bill 23,417, now pending before the committees on patents of both the senate and house of representatives, contains a clause to take from the manufacturer of a patented article the right to control its price at resale.

Robert B. Dunlap, sales manager of the C. A. Shaler Co., calls attention to some of the results that would follow the enactment of the bill, particularly with regard to that phase.

"It would seem probable that an attempt will be made to railroad this bill through by the fact that it is attached to another measure prohibiting manufacturers from buying patents and burying them, making compulsory that they manufacture them within 4 years of the granting of the patent in such quantities as to supply the demand, or forcing them to permit others to manufacture under the patent," says Mr. Dunlap. "Thus far all that has been published in favor of the measure has apparently been in an endeavor to show that the present law is for the good of no one but the manufacturer and that its repeal would be of benefit to all others affected."

"An investigation from an unbiased viewpoint, however, would seem to reveal that it will work to the detriment of five classes alike, and these five classes make up 95 per cent of the citizens of the entire country. In fact it would seem that the only benefit would accrue to cut-rate concerns and mail order houses. The five classes referred to are as follows: Manufacturers, jobbers and dealers, publications, inventors and consumers."

In describing the situation Mr. Dunlap says: "A patented article is necessarily a new device and as such usually requires a great deal of publicity to acquaint the

public with its merits. The manufacturer sets a retail price which will allow himself, the jobber and dealer a legitimate profit and provide for advertising. It is generally several months before the business grows to a profitable basis and when it does reach that stage, the cut-rate houses become active, and unless the manufacturer is given the protection of the law, undue advantage may be taken by such concerns, thus demoralizing the trade."

Mr. Dunlap has submitted his views to the directors of the Motor and Accessory Manufacturers, calling upon that organization, thus demoralizing the trade.

DICK CASE SETTLED

New York, May 22—Under the mandate of the United States supreme court, the United States circuit court of appeals has made final disposition of the Dick-Henry patent case by handing down its decision in conformance with the rulings of the supreme court. This adjudges victory to the A. B. Dick Co. and affirms the ruling of the court. The case is the one which brought the discussion of the present patent laws to a crisis this spring. The Dick company sold a mimeograph to a woman customer who purchased ink to use with it from the defendant company. Dick sued the seller of the ink and the court held that there was infringement of the patent rights of the complainant.

OPPOSES OLDFIELD BILL

New York, May 20—The Merchants' Association has passed a resolution committing that organization to oppose the Oldfield bill, by the enactment of which in congress it is proposed to recodify and revise the entire present patent law of the land. The association lays particular stress upon its objections to sections 17 and 32. Section 17 is the clause of the bill which provides for compulsory licensing and the other section provides that a patentee may not restrict the use of his device in the hands of the purchaser with respect to the use, with or by it, of other materials.



GENERAL PLAN OF THE B. F. GOODRICH CO. PLANT AT AKRON, O.

Pabst Gives Milwaukee Race Trophy

MILWAUKEE, Wis., May 21—A trophy of greater intrinsic value and carrying larger emoluments than any other prize ever offered for a contest for motor cars has been donated by Colonel Gustave Pabst, the millionaire Milwaukee brewer, as a trophy for a third race to be run in conjunction with the Vanderbilt cup and grand prix road races at Milwaukee in September. While the actual cash value of the new cup has not been given out, an idea of its worth may be gained from the fact that Colonel Pabst has set aside the sum of \$2,500 as the prize to the trophy designer whose work is chosen as the model for the new prize.

Pabst Trophy for Light Cars

It is likely that the Pabst trophy will be for light cars. It will be known officially as the Pabst Blue Ribbon trophy and the deed of gift now in preparation will make it a perennial prize, the annual winner to receive a replica for permanent possession, together with a monthly stipend of a large sum during his tenure of holding the cup.

It has not been decided if the new trophy is to be a national or an international one and until this has been determined the recipient of the deed of gift will not be known. In any event, the formal presentation to the A. A. A. or the A. C. A., as the case may be, will take place at Indianapolis on Memorial day, just before the beginning of the 500-mile sweepstakes at the speedway.

A feature of the deed which accompanies no other motor cups will be the participation of the manufacturer of the winning car in the emoluments, as well as the driver.

Fourth Trophy Given

A fourth trophy to be competed for during the big road race carnival at Milwaukee in September also is announced. The Wisconsin Motor Mfg. Co., of Milwaukee, has donated a silver and gold cup costing \$2,500, to be known as the Wisconsin Motor trophy and will be competed for at least twice, as the deed of gift grants permanent possession of the cup upon two successive victories. The trophy will stand at least 40 inches high. It is the gift of Charles H. John, president, and A. F. Milbrath, secretary of the Wisconsin Motor Mfg. Co.

Cash prizes aggregating \$16,750 will be hung up by the M. A. D. A. in addition to the four trophies, Vanderbilt, grand prix, Pabst Blue Ribbon and Wisconsin Motor, for the four events which will make up the program of the big speed carnival in Milwaukee. There will be four cash prizes for each race, making sixteen purses in all. The highest cash prize will be \$5,000 and the lowest \$250, with \$2,500, \$1,000 and \$750 as intermediates, depending upon the importance of the events.

Blue Ribbon Cup Likely to be Hung Up in Contest for Light Cars—Wisconsin Motor Mfg. Co. Also Contributes \$2,500 Prize—Cash Offerings Total \$16,750

In addition, manufacturers of magnetos, carbureters, tires, oils, etc., will come in with cash prizes, as usual, making a possible cash prize list of \$25,000 to \$30,000. This list will not be ready for announcement for at least 2 or 3 weeks.

The official entry blank is now being prepared, but the issue will await the completion of the deeds of gift of the Pabst Blue Ribbon and Wisconsin Motor trophies.

The two Milwaukee cups will be in charge of the Motor Cups Holding Co., under trust deed until they are first awarded to the winners of the respective races.

Course Not Yet Selected

Contrary to expectations, the course was not selected, nor was the prize list announced, at the meeting of the Milwaukee Automobile Dealers' Association last Thursday. The meeting developed into a rousing rally to raise a fund of \$50,000 for the expense of the road racing carnival. A committee representing every known organization interested in Milwaukee's welfare was appointed and Mayor G. A. Bading consented to act as chairman and lead the campaign. A large part of the fund has already been promised or subscribed. No difficulty is expected to be encountered in raising the entire \$50,000.

The delay in the selection of a course is due to the fact that the N. A. D. A. has been obliged to search into the old world for the owners of acreage along proposed routes for the desired consent to the running of motor races on the public highways. The association is not looking forward to only 1 year of racing, but its requests to property owners are for 3 or more years of consent, assuring more big road races for Milwaukee in years to come. One or two of the biggest acreage holders are at present traveling in Europe and it was to get in touch with these that the delay was caused.

Another reason for getting a long term consent on the use of the highways for racing is the idea of the N. A. D. A. to make the course to be built permanent. This will require a lot of money and the large expenditure would demand more than a single racing carnival to make it anything like a profitable investment.

It is now certain that the details concerning the course will be ready for final action at the next meeting of the N. A. D. A., which takes place Wednesday night.

It is reported that the course to be finally selected will be one entirely different from those that have been dis-

cussed publicly and described in previous issues of Motor Age. Considerable secrecy surrounds the new route in view.

Dates Still Uncertain

The dates for the big races are still causing the N. A. D. A. some concern. These also will be selected Wednesday night. It is rumored that an attempt is to be made to run the main event on Labor day, September 2, and the other events on the Saturday preceding, although this seems entirely out of the question because of the close proximity of the Elgin road race dates. It is not believed that the N. A. D. A. would risk what would practically be a conflict with the Chicago promoters. In addition, the Indianapolis speedway people are figuring on a Labor day track meet.

It seems probable, therefore, that the week of September 15 or 23 will be chosen. The American Automobile Association has suggested September 17 to 21 as being the choicest dates so far as avoiding conflicts are concerned, and its suggestion looks like the one best bet.

F. A. McHugh, of Cleveland, has already prepared plans for the grandstands and bleachers, which will seat an aggregate of 60,000 people. The cost of the stands will be in the neighborhood of \$15,000. Mr. McHugh plans ten stands, each twenty tiers high, with twelve sections of reserved seats in each; 600 boxes, accommodating 4,200, and bleachers for 30,000. Negotiations are going on with the Chicago and Northwestern Railroad Co. and the Milwaukee Electric Railway and Light Co. to run spur tracks from their main lines to the stands.

The organization of the road building forces is now under way, the state highway commission lending the aid of expert engineers. It is planned to start ten crews on ten stretches of the course at once. Each crew will then have a mile or little over a mile to build and the work can be finished by August 1.

GIVE UP ROAD RACE IDEA

Philadelphia, Pa., May 18—It appearing altogether unlikely that the Fairmount Park road race will take place in Philadelphia this year, officials of the Quaker City Motor Club are concentrating their activities on the meet to be conducted by the club on Saturday, June 8, at the Belmont Driving Club, Narberth. Efforts are being put forth to arrange a match race between Bob Burman and Barney Oldfield, in addition to which eight other events are on the card.

Elgin Road Races for Non-Stock Cars

Chicago Motor Club Decides to Run Annual Meet Under Class C Rules and Also to Confine Sport to 1 Day—Two Contests Dropped—Algonquin Card

CHICAGO, May 20—Because of the lukewarm interest being shown by American manufacturers in stock car competitions, the Chicago Motor Club has made radical changes in its card for the coming season. First, the Algonquin hill-climb program has been changed by making most of the events non-stock, while more important still, the annual road races at Elgin have been changed to non-stock and two of the events dropped, which will reduce the meet from 2 to 1 day.

Before taking action in the matter of Elgin, the club carefully canvassed the industry, but failed to get many promises of entry in a stock car meet. In fact, the outlook was so discouraging that it was believed that if the stock car idea was attempted again the meet would be a failure. With so gloomy an outlook before them the directors at their meeting last Thursday accepted the recommendation of its contest board that Elgin be cut to 1 day and that only two races be run, both of them class E contests. Of course, the Elgin National trophy race will be retained. That will be for class E cars of 600 cubic inches capacity and less. The other will be a 231-300 class race, which undoubtedly will be run in the morning, with the big race in the afternoon. The date will be August 24.

DENVER TRACK MEET RESULTS

Denver, Colo., May 20—Denver's first race meeting of the year opened Saturday for a 2-day session at Overland park in the presence of 3,000 people. The Case team was the main attraction and gave local people an interesting though not a spectacular or record-breaking program. The 290-horsepower Jay-Eye-See car was a great disappointment, and at no time of the first day's meet made a satisfactory performance. The fault was partly that of the track, which was very heavy in the back stretch for a car of such size, but Disbrow had difficulty with his ignition in both trials that he attempted, and was forced to leave the track. The two trials that he made he finished in the same time—1:03 3/4 for the mile.

Despite the failure of his big car, Disbrow was the star of the day, for the Simplex Zip performed perfectly and gave an exhibition of speed and reliability that made a distinct impression on the crowd. In the 5-mile time trial he clipped 4 seconds from the Overland track record, making the run in 5:04 1/2. Twice in Saturday's program he ran against the mile record of the track which was made several years ago by Barney Oldfield in the

Blitzen Benz, but he lacked a second in the better trial, which he finished in :56 1/2. Joe Nikrent and Neil Whalen gave splendid exhibitions in the Case Bullet, White Streak and Little Giant. The only local entrant was Charles Hendy, local Ford manager, who put in a Ford touring stock chassis, which was driven by Peyton Hough.

An interesting feature of the meet is the fact that the nineteen motor associations of the state which are affiliated with the Colorado Automobile Association sent representatives to Denver for the 2 days. They made careful observations of road conditions as they toured in and their reports will receive careful attention of the good roads authorities of Colorado. Saturday's summaries:

Exhibition time trials, 1 mile.—Disbrow, Simplex Zip, won; time :58 1/2; Disbrow, Case White Streak, second; time, 1:05 1/2; Nikrent, Case Bullet, third; time, 1:07 1/2. Three-cornered match race, class C, non-stock, division 3C—3 miles.—Disbrow, White Streak, won; time, 3:44 1/2; Whalen, Little Giant, second; Nikrent, Bullet, third. Five-mile exhibition for track record.—Disbrow, Simplex; time, 5:04 1/2. Track record. Five miles, class E, non-stock handicap for cars of 300 cubic inches and under.—Whalen, Little Giant, won; time, 5:59. Australian pursuit race, class C, non-stock, division 3C—Disbrow, Simplex, won in three laps. Exhibition mile by Disbrow in Jay-Eye-See.—First trial, 1:03 3/4; second trial, same. Class D—Free for all handicap.—Disbrow, Simplex, won; time, 5:25 1/2. Exhibition by Disbrow in Simplex against track record.—First trial, :58 1/2; second trial, :56 1/2.

Three local records were broken the second day. Despite poor track conditions, no accidents marred the meet. Disbrow drove his Simplex 5 miles in 4:46 1/2, breaking Oldfield's record for the track, which was 4:59. In the Australian pursuit race, Disbrow caught four cars in 6 miles and completed the race in 5:54. In the special event, Ball, a local entrant, in an Apperson made a new track record for 2 miles in 2:04 1/2. Summaries for the second day:

Exhibition 1 mile.—Disbrow, Jay-Eye-See, won; Nikrent, Case Bullet, second; Disbrow, Case White Streak, third. Time, 1:01 1/2. Five miles, class C, nonstock, 231-300 class.—Whalen, Case White Streak, won. Time, 5:40. Five-mile handicap.—Disbrow, Simplex, won; Ball, Apperson, second. Time, 5:16. Five miles, class E, handicap for cars under 300.—Whalen, Case Little Giant, won; Nikrent, Case Bullet, second; Hough, Ford, third. Time, 5:40. Exhibition 2 miles against track record.—Ball, Apperson, won. Time, 2:04 1/2, record. Australian pursuit race.—Disbrow, Simplex, won. Time, 5:54 for 6 miles. Five miles, free-for-all handicap.—Whalen, White Streak, won. Time, 5:40.

DENVER PLANS CHANGED

Denver, Colo., May 20—Heavy storms which have played havoc with roads east of Denver and an unusually interesting political campaign here next week have combined to delay again the proposed Denver Chamber of Commerce sociability run

to Indianapolis, which was scheduled to begin next Saturday. The date has now been set for June 25 and a material change made in the itinerary; Indianapolis has been omitted and the destination is Chicago alone. A longer stop than had been arranged originally will be made in the Windy City. The Denver Chamber of Commerce has received the active co-operation of the Denver Motor Club in managing the run and the club officers have guaranteed twenty entries from their own number or friends. The postponement will bring the run at a time in the summer when more Denver people can enter than if it should take place this month, and the management now believes that a larger and better tour will result.

BEACH MEET ATTRACTING MANY

Galveston, Texas, May 18—Since the announcement was made by Captain J. W. Munn, president of the Galveston Automobile Club, that the American Automobile Association has given its official sanction of the program for the 3 days' meet that is to be held here August 8, 9, 10 he has received assurances of a large number of entries. He expects the entries will commence coming in soon after June 1. In response to inquiries he has given detailed information concerning prizes and events to a number of racing men in different parts of the country. The course is an unbroken stretch of 30 miles of sand beach. The meet is to be held under the auspices of the Galveston Automobile Club and the Texas cotton carnival. The prizes aggregate more than \$6,000.

BIG RACE OFFICIALS CHOSEN

Indianapolis, Ind., May 21—Officials for the 500-mile race on the speedway have been chosen. R. P. Hooper, president of the American Automobile Association, is honorary referee; A. R. Pardington is referee; F. J. Wagner, starter; Ray Harroun and E. J. McShane, assistant starters; C. H. Warner, O. C. Foster, Harry Knepper and William Knight, timers; Will H. Brown, Thomas J. Hay, J. J. Cole, H. O. Smith, J. W. Hayden, J. M. Ward, Jr., and Howard Marmon, judges; Charles P. Root and C. H. Wallerich, clerks of course, and F. E. Edwards, chairman of the technical committee.

The first accident during the practice for the 500-mile race occurred Sunday when Gil Anderson's Stutz No. 1 turned a triple flip-flop at the northeast turn. Anderson and his mechanic escaped injury and the machine was not badly damaged, being out for practice today as usual. Anderson was driving at a speed estimated at 92 miles an hour, clinging close to the edge of the track. The grease on the turn caused the car to slip off into the mud and it turned over three times, the last turn depositing the car in the mud.

Brake Tests Prove Motor Car Safety



NEW YORK ALDERMEN WATCHING BRAKE TESTS

NEW YORK, May 18—Ten New York aldermen, accompanied by motoring leaders and newspaper men, held a series of tests this week to determine the minimum distance within which a fully-loaded seven-passenger touring car can stop when traveling at various rates of speed. These brake tests were for the purpose of deciding whether or not the present speed limits of from 8 to 16 miles per hour could be raised to 20 or 25 miles per hour without endangering the public. Charles G. Stewart, general manager of the New York Automobile Dealers' Association, suggested the tests and C. S. Henshaw, manager of the New York Thomas branch, furnished five six-cylinder 40-horsepower cars for the trials.

The object of the experiments was to determine the minimum stopping distance, using the foot or service brakes only when applied with sufficient force to lock the rear wheels. Mr. Stewart claimed that when a car is traveling at various rates of speed, the driver can bring it to a standstill before striking a pedestrian, if the latter is seen and the brakes applied 1 second in advance. To substantiate his claims, he volunteered to stand in the middle of the road, facing the oncoming machine, and at a distance from a reference point equal to that passed over in 1 second by the car when traveling at any given speed in miles per hour, as indicated by a speedometer.

Accordingly, a tape line was laid across the road and from this a distance corresponding to the car's speed in feet per second was laid off from it. Mr. Stewart stood at this position, facing the oncoming car, which was fully loaded with six of the aldermen and the driver, and which had been driven down the road a sufficient distance to allow for its attaining the given speed before reaching the tape. One member of the aldermanic committee carefully watched the car's speed to see

that it was correct when crossing the line. At the instant the front wheels crossed this point, the service brakes were applied and the rear wheels locked, the distance from the line to the extreme front point of the car being measured after it had been brought to a stop. Mr. Stewart had a margin of about 7 feet when the car was driven toward him at the 15-mile rate. The procedure as outlined was followed for rates of speed varying from 15 to 30 miles an hour, with results as given below:

Speed of car, miles per hour	Speed of car, feet per second	Distance required to stop	Tread
15	22.0	14 ft. 10 in.	Non-skid
20	29.3	25 ft. 1 in.	Non-skid
25	36.7	33 ft. 4 in.	Non-skid
30 first trial	44.0	54 ft. 8 in.	Non-skid
30 second trial	44.0	48 ft. 8 in.	Smooth

Average macadam road surface
Overall length of car, 16 feet 3 inches
Weight of car fully loaded, 4,450 pounds
Brake diameter, 17 inches
Brake width, 2½ inches

Mr. Stewart's contention was proven to be true for speeds up to 25 miles an hour, although it was doubtful above that rate, as shown from the fact that in both trials at 30 miles an hour he was obliged to jump to avoid being struck by the car. With non-skid tread tires, the mark was outdistanced by 10 feet 8 inches, and with smooth treads by 4 feet 8 inches. This difference may be due to the fact that the driver did not apply the brakes at exactly the same time in both trials, or because there was more tire surface in contact with the road when the smooth treads were used. The non-skid tread is most efficient on wet pavements, it was asserted.

Next, trials under the same conditions and with the same procedure were made on a smooth asphalt pavement. The results follow:

Car speed, miles per hour	Distance to stop
20	28 ft. 3 in.
30 first trial	65 ft.
30 second trial	83 ft.

Here, again, the 30-mile speed did not

New York Aldermen Witness Demonstration Studying Speed Problem

show off to advantage. The tires were smooth treads for these tests, and the widely varying results at 30 miles are due to the striking in the second trial of a wet spot in the street.

These tests show conclusively that speeds up to 25 miles an hour on ordinary streets where there is no appreciable amount of traffic are not excessive, when a driver of ordinary experience is at the wheel. The present city limit of 18 miles an hour might well be raised somewhat, without in any way increasing the hazard where motor cars are used in a sane manner. Of course, there are reckless drivers, and to them the credit for most of the accidents is due.

In making these tests, the worst conditions so far as weight is concerned were imposed. With a total weight of 4,450 pounds, considerable momentum is gained, and requires more force and greater distance in which to stop them if a five-passenger car or a runabout were used.

In commenting on the results obtained, Mr. Stewart said, "In congested districts it is not a question of speed at all. There, more than 15 miles an hour cannot be made under any circumstances and often it is as low as 5 miles. But in the open districts, I think that the regulations should specify that he should use his own discretion before making an arrest, and that the policeman should not arrest a man going at 30 miles an hour if there is no one near to be endangered by that speed. If the speed limit is too low, there will be constant violations. It would be better to raise the limit and have strict observance of the law. There would be none who would be more willing to observe such regulations than the Automobile Dealers' Association."

TO STOP CAR STEALING

Washington, D. C., May 21—Congressman Ben Johnson has introduced a bill in congress to put a stop to motor car stealing here. By the terms of the bill the offense is punishable by imprisonment in the penitentiary for from 1 to 10 years. There is no alternative in the way of a fine. The bill was suggested by the district attorney and is in the exact wording of the New York law on the subject. From March 14 to May 14 twenty-nine motor cars were stolen by joy riders in the district, and in every case the machine was abandoned in a damaged condition. In the few convictions made the highest penalty given any of them was 6 months in jail.

Only One New York Show Next Winter

Automobile Board of Trade Will Manage Affair in Garden and Palace

Representative Carey has introduced a bill providing that every person operating a motor car in the District of Columbia shall stop whenever it passes a street car which is either taking on or letting off passengers.

NEW YORK BOOSTERS MEET

New York, May 18—The largest motor trade function for the year in the neighborhood of New York was held last Wednesday evening when the spring outing of the Big Village Motor Boosters was held. Through the courtesy of the New York Athletic Club, the clubhouse at Travers Island was turned over to the enthusiastic boosters and a royal good time was had by all. A crowd of 225 assembled at Columbus circle shortly after 6 o'clock, where they were met by sixty motor cars decorated with red flags. The clubhouse was reached at about 7 o'clock and during the short interval between the time of arrival and the dinner the time was given over to introductions and a survey of the beautiful grounds around the building. During the dinner an interesting vaudeville entertainment was in progress which was loudly applauded by the whole company. After the dinner a few more vaudeville numbers were given which were assisted by a few impromptu sketches by some of the more enthusiastic members of the party. The entertainment was concluded by an exhibition of moving pictures of the Jeffries-Johnson fight. Among those who attended were many prominent in the motor industry. The Boosters now are well established.

NEW YORK, May 20—Radical changes in show plans so far as New York is concerned have been made by the Automobile Board of Trade, which today announced that next winter only one motor exposition will be held in this city and that, while both Madison Square garden and Grand Central palace will be used, the entire affair will be under the management of the Automobile Board of Trade. The announcement is as follows:

New York will have but one motor show next winter, and it will be so big as to make necessary the use of two buildings. This was settled definitely last week, when a contract was signed for the use of Madison Square garden by the Automobile Board of Trade, which also has a lease on the new Grand Central palace. The combined shows will be held under the auspices of the Automobile Board of Trade, the exhibits being divided between the new Grand Central palace and Madison Square garden.

According to present plans, the shows will be open to all makers of motor cars and accessories, but the plan of allotting space has not been definitely settled. It is not unlikely that a single ticket will admit to both buildings with arrangements for conveniently transporting visitors from one building to the other.

It was believed that Madison Square garden would remain up for a year, but the announcement of the Board of Trade makes this a certainty. The Grand Central palace people state that plans for their Arena, which is to be built alongside the present palace, are being perfected and that it will be ready for the 1914 show.

The show committee of the Automobile Board of Trade that will have in charge the big double exhibition next winter, are Colonel George Pope, chairman; Charles Clifton, Alfred Reeves and Merle L. Downs.

It will be noted in the foregoing that no changes have been made in the personnel of the show committee and that in subsequent years the consolidation of the shows will progress to the stage where they will be held in adjoining buildings.

OLYMPIA TO HAVE OVERFLOW SHOW

London, May 11—Owing to the great demand for space at Olympia, and to meet the requirements of the firms who were unable to obtain space for this show, it has been decided to hold an overflow show at

the Agricultural hall on the same date as the Olympia show.

In the early days of motoring, the shows were held at the Agricultural hall at the time they were run as a private enterprise in connection with the Motor Car Journal. In 1902, the Society of Motor Manufacturers and Traders was formed, one of the chief objects of this society being the organization and holding of shows for the benefit of the trade. The first shows of this society were held at the Crystal palace. These shows were so successful from a financial point of view that it enabled the society to take over Olympia, a building which had up to this time been very little used. In conjunction with the proprietors of this building certain structural alterations were made, with the result that a very fine exhibition hall was provided.

PHILADELPHIA RULES ON HORNS

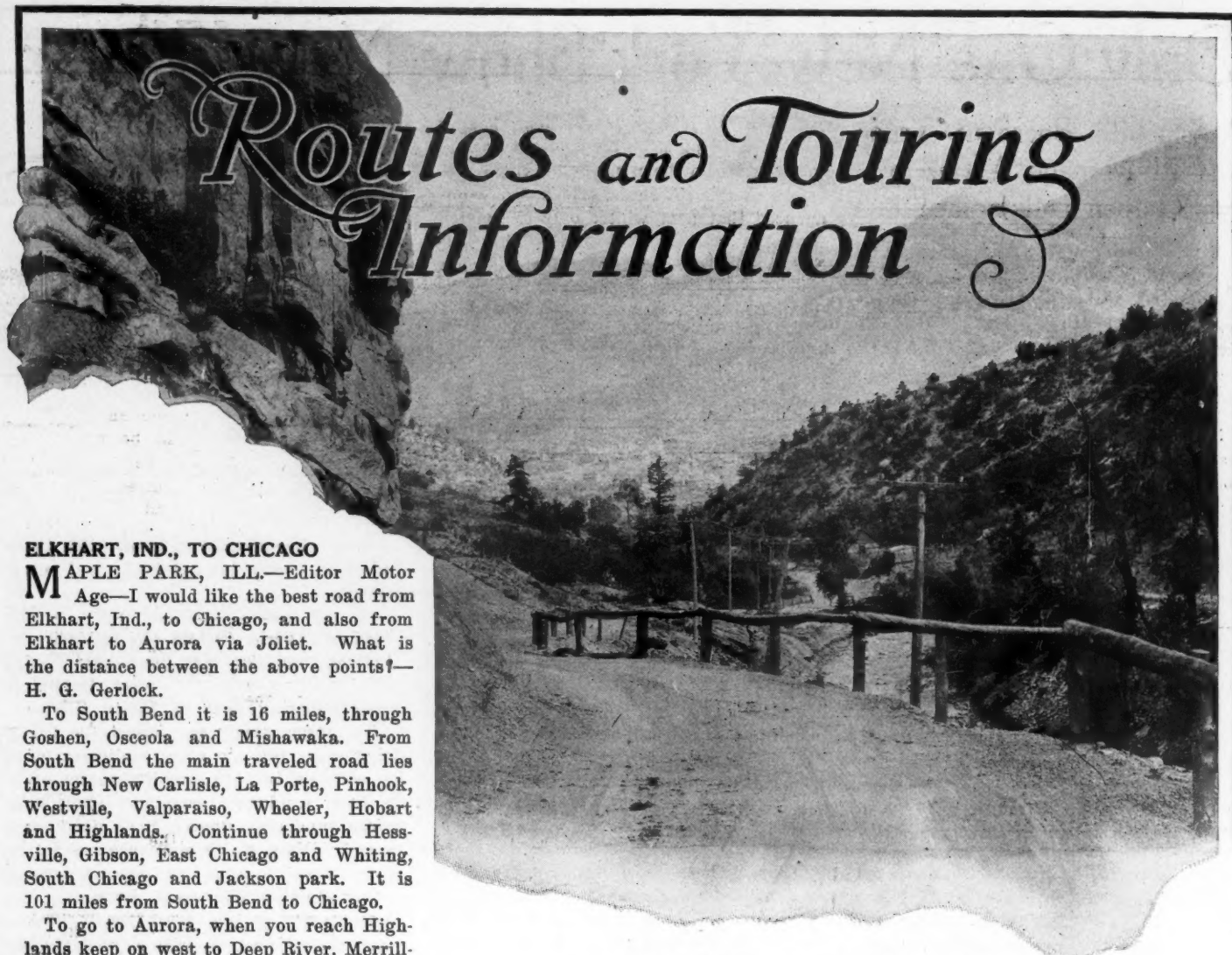
Philadelphia, Pa., May 18—Director of Public Safety George D. Porter, through Acting Superintendent of Police George W. Thompson, this week issued the following order relative to an ordinance of city councils in 1906 prohibiting motorists from employing warning signals or devices producing unnecessarily loud or unseemly noises, which ordinance has just been sustained in an opinion handed down by City Solicitor Michael J. Ryan.

General Order No. 186, issued June 22, 1906, contains, in full, the ordinance of councils approved June 18, 1906, requiring motor vehicles to use only as an alarm of warning a toot-horn or horn sounding one note only. This ordinance has been sustained by the city solicitor. Many complaints from citizens have been received concerning the use of signaling devices other than toot-horns producing loud, unseemly and startling noises, tending to terrify pedestrians and disturb the peace and quiet of the city. All such devices are a violation of the aforesaid ordinance and must be discontinued.

The police have been instructed to report all violations.



MEMBERS OF NEW YORK BIG VILLAGE MOTOR BOOSTERS ATTEND SPRING BANQUET



ELKHART, IND., TO CHICAGO

MAPLE PARK, ILL.—Editor Motor Age—I would like the best road from Elkhart, Ind., to Chicago, and also from Elkhart to Aurora via Joliet. What is the distance between the above points?—H. G. Gerlock.

To South Bend it is 16 miles, through Goshen, Osceola and Mishawaka. From South Bend the main traveled road lies through New Carlisle, La Porte, Pinhook, Westville, Valparaiso, Wheeler, Hobart and Highlands. Continue through Hessville, Gibson, East Chicago and Whiting, South Chicago and Jackson park. It is 101 miles from South Bend to Chicago.

To go to Aurora, when you reach Highlands keep on west to Deep River, Merrillville, Schererville, Dyer, to a point south of Chicago Heights, where you follow the trolley line and the main traveled road most of the way into Cass street in Joliet. By going through Plainfield you reach Aurora. This makes a distance of about 65 miles from Highlands. Volume 4 of the Blue Book gives running directions on the middle western section.

SHORT CUT TO DENVER

Muskogee, Okla.—Editor Motor Age—I am contemplating a trip to Denver, Colo., from Muskogee, Okla., and would like to know what is the shortest and best route, number of miles and best time to make the trip.—Subscriber.

The roads from Muskogee to Oklahoma City in dry weather are good. Don't be afraid to ford streams, they never are as bad as they look. It is only 165 miles to Oklahoma City through Boynton, Morris, Okmulgee, Sharps, Okemah, Bearden, Tecumseh, Shawnee, Newalla and Marion. Either set out to make this in one day or your first night stop at Okmulgee because of better hotel accommodations.

Oklahoma City to El Reno is directly west over 27 miles of fast roads. The Chisholm trail is followed north out of El Reno, and to the Oklahoma-Kansas state line over this road it is a distance of 108 miles, passing through Okarche, Kingfisher, Do-

ver, Hennessey, Bison, Waukomis, Enid, Kremlin, Pondereek, Jefferson, Medford and Renfrow. Three more miles will take you to Caldwell, Kan., and 48 miles to Wichita, on the Santa Fe trail, through Wellington, Riverdale and Peck. There is a road to Wichita, Kan., direct from Oklahoma City which saves about 27 miles; it is understood that the roads are not so good. The towns are Britton, Edmond, Guthrie, Mulhall, Orlando, Perry, Ponca, Newkirk, Arkansas City, Kan., Winfield and Mulvane.

There are two roads for you to choose from in routing on to Dodge City. One is over the Santa Fe trail through Newton, Halstead, Burrton, Hutchinson, Nickerson, Sterling, Lyons, Chase, Ellinwood, Great Bend, Dundee, Pawnee Rock, Larned, Garfield, Kingsley, Taft, Offerle, Spearville, Wright and Dodge City. This is about 211 miles. The shorter route takes you from Wichita directly west to Goddard, Garden Plain, Kingman, Cleveland, Cullison, Wellsford, Greensburg, Ford and Dodge City.

Dodge City, to La Junta, Colo., is 221 miles, routing through Sears, Howells, Cimarron, Ingalls, Charleston, Pierceville, Garden City, Lakin, Hartland, Kendall, Mayline, Syracuse, Medway, Coolidge,

Holly, Grenada, Keon, Grote, Morse, Lamar, Hasty, Las Animas, La Junta. The connecting road between La Junta and Pueblo, which is on the Great North and South highway, passes through Swink, Newdale, Kremis, Rocky Ford, Manzanola, Fowler, Nepesta, Avondale. You now proceed to Eden, Dawkins, Buttes, Fountain, Colorado Springs, Pikeview, Husted, Palmer Park, Perry Park, Sedalia, Acequia, Littleton and Denver. Pueblo to Colorado Springs is a distance of 45 miles over good natural road, some adobe and a little sand. Between Colorado Springs and Denver there is a gravel, sand and clay mixture, some small grades and sharp turns. It is a distance of 70 miles.

July, August and September are good touring months for all but southern trips.

TO ALEXANDRIA, MINN.

South Auburn, Neb.—Editor Motor Age—There will be two cars go from here to Alexandria, Minn., in July, and I should like to know the best route and distance.—W. H. Linn, M. D.

Motor to Nebraska City from Auburn and cross the river into Iowa. The Wau-bonsie trail passes through Shenandoah, Clarinda, New Market, Ladoga; the Saints' highway through Gravity, Sharpsburg,

A GLIMPSE OF MANITOU FROM UTE PASS IN COLORADO

Eastern Road Reports for Spring Trips

INFORMATION comes from the eastern department of the Touring Club of America at Boston, Mass., that a trip is being worked at Winchester. It is not for speed, but for failure to sound horns. Road between Taunton and Brockton is in rough shape in places. Country roads on the whole are bad. En route to Lowell via Winchester, Burlington and Billerica the road is in very fair shape, and the one by Woburn and Tewkesbury is in fine condition. From Boston to West Barnstable the road is good, then come several short pieces of sandy new road on to Centerville. The route to Milford via Wellesley, Sherborn and Holliston, 70 miles, is mostly over fine roads and all of the way good going. Return via Holliston and South Framingham. Boston to Providence, R. I., is over fair roads with the exception of a section in Rhode Island. Continuing to Worcester they are abominable, and on to Boston they are fair. The Boston post road through Greenwich, Stamford and Bridgeport is in remarkably good condition, considering the backwardness of the season and the unusually heavy spring rains.

New Haven to Waterbury via Seymour is in good condition. The road over the hills between Newton and Danbury is in need of attention. After leaving Danbury the roads are in good condition and upon crossing the boundary line into New York the state roads in Westchester county are in perfect condition for more than 30 miles to North White Plains.

Bridgeport to New Haven is fair; New Haven to Hartford the road is fine; Hartford to Springfield, good to Longmeadow; from there to Springfield it is very bad.

Springfield to Boston, good except at Palmer, where it is bad at Park street.

All motorists are cautioned to use care to observe the Boston traffic regulations on Commonwealth avenue from Lake street to Norembea park as to fast driving and blowing of horns. Boston to Woodstock, Vt., motorists will find road conditions good. Detours are necessary at Ashby, Mass., to Asburnham, Pequoig and Ringe, N. H., there being several miles of impassable new road on the direct route from Ashby to Ringe. The return trip from Woodstock to Boston by way of Springfield can be made over the regular route. The roads as far as Laconia are good, but very bad north to Meredith, N. H. No detours are necessary, however.

The Boston to Poland Springs, Me., road is in good condition. The trip is made by the shore route via Portsmouth and Portland. The state road to Portsmouth, N. H., is good and then somewhat rough to York Beach, thence about 2 miles of avoidable ruts, intermittently following newly worked and fair roads to Portland. An enjoyable side trip can be made around the beach at Rye instead of going direct into Portsmouth. At Wells avoid the direct road through the woods to Biddeford, and go through Kennebunkport via the shore road. This run can be made in 9 hours.

The roads from Albany, N. Y., to Pittsfield, Mass., to Springfield and all through the Berkshire hills and Connecticut valley are in splendid condition. The Jacob's Ladder road is passable. During the repairs to the road between Pittsfield and Lenox convenient detours can be made.

A route from Boston to Worcester leaves over Beacon street and Commonwealth avenue to Newton, Newton Center, Waban, Wellesley Hills, Wellesley, Natick, South Framingham, follow trolley around curve about two-thirds of the way, then straight ahead to Framingham, Marlboro, Fayville, Sudbury reservoir, Worcester. The state road is slightly rough but generally good. Return from Framingham to Cochituate to Norembea park and in over Commonwealth avenue, as these roads are better.

For 2 months in Bourne on the Falmouth line a detour will be necessary. Travel between Falmouth and Barnstable for the next two years is directed by way of Cotuit because the road via Mashpee Village is being built. On the Taunton-New Bedford road a detour is better by way of Myrick's station.

On the Seekonk-Rohoboth-Swansea road, on the way from Fall River to Warren, it would probably be better to take the next road north. The Ashburnham road on the line between Fitchburg and Rindge will be difficult, probably impassable, and the better road would be via Gardner and Winchendon. At Northfield, on account of work being done both north and south of the town, it is advisable to take the other side of the river.

At Buzzard's Bay the bridge over the canal is open for travel going south to Falmouth and is located perhaps $\frac{1}{4}$ mile east of the old bridge.

Country roads in northern Ohio are for the most part now in a fairly passable condition, largely due to the use of the King drag.

Lenox, Kent, Creston, Orient; a connection is made with the River-to-River road by routing through Menlo, Stewart, Dexter, and Adel. Motor east from Adel to Ortonville, Waukeg, Des Moines, Mitchellville, and Colfax, to Newton, then head north to Laurel, Marshalltown, Whitten, Ackley, Hampton, Sheffield, Rockwell, Mason City, Manly, Kensett, Northwood, Glenville, Albert Lea, Geneva, Owatonna, Medford, Faribault, Dundas, Northfield, Farmington, Rosemont, St. Paul.

There are no fewer than seven ways in reaching Minneapolis. Twelve miles is the shortest distance between the Twin cities, and two different routes will give this mileage. One is by way of University and Central avenues; the other past Lake Como and the state fair grounds. The longest drive is 23 miles and leaves St. Paul over West Seventh street for Fort Snelling, Minnehaha Falls, and the Lakes. For the remainder of the trip to Alexandria you will find this outlined in a communication headed Genoa Junction, Wis.

Nebraska City to Gravity, Ia., is 65 miles; to Creston it is 40 miles; to Adel, 65 miles; to Des Moines and Newton, 47 miles; Newton to Marshalltown is 31 miles; to Mason City it is a distance of 91 miles; to Owatonna, 73 miles; to St. Paul, 70 miles; Minneapolis to Alexandria, 142 miles.

TEXAS TO INDIANA

Whitesboro, Tex.—Editor Motor Age—I am contemplating a motor trip to Mt. Vernon, Ind., as soon as the weather permits. Please publish the best and shortest route and also a map if convenient.—M. Raney.

In this issue Motor Age has outlined a route for another party in Whitesboro whose destination is Evansville, Ind. This suggests to us that it would be an excellent idea for the two cars to travel together. Should you not care to make such a long trip, a suggestion would be to leave them at Newton, Kans., and head east to Walton, Peabody, Florence, Clements, Elmdale, Cottonwood Falls, Safford-

ville, Emporia, Waverly, Agricola, Silksville, Williamsburg, Ransonville, Homewood, Ottawa, Wellsville, Edgerton, Gardner, Olathe and Kansas City. The only available road from Kansas City to St. Louis passes through Independence, Blue Springs, Odessa, Higginsville, Corder, Blackburn, Marshall, Shackleford, Gilliam, Glasgow, Higbee, Renick, Mexico, Martinsburg, Wellsville, New Florence, Warrenton, Wright, Wentzville, St. Charles and St. Louis. Crossing Illinois to Carlyle, Sandoval, Salem, Olney and Mt. Carmel you reach Mt. Vernon. When the weather is all right, there is a good road leaving the above at Sandoval through Centralia, Dix, Mt. Vernon, Ill., McLeansboro and Carmi to Mt. Vernon, Ind. Another one which local motorists use leaves the same road just east of Sandoval at Salem, then routes south to Mt. Vernon, Ill.

It is not absolutely necessary to take this round-about way, for from Sherman to Bonham, then over the Dallas-Texas-

kana highway to Texarkana, there is a satisfactory road. But, in passing through Arkansas, with the exception of Hot Springs and Little Rock the towns are all small. Another difficulty is the number of streams to be forded. After leaving Texarkana your route through Mandeville, Homan, Fulton, Hope, Emmet, Prescott, Arkadelphia, Lawrence, Hot Springs, Benton, Little Rock, McAlmont, Cabot, Ward, Beebe, Searcy, Judsola, Baldknob, Russell, Bradford, Newport, Grubbs, Pitts, Cash, Jonesboro, Paragould, Marmaduke, Rector, Piggott, St. Francis, Campbell, Aquilla, Allenville, Jackson, Perryville, Lithium, Claryville, crossing the Missouri river to Chester.

A motorist in Mena, Ark., followed this route last summer, and had very bad weather. Nevertheless he had unusual luck in plowing through the Cypress bayou bottom lands, the mudholes and corduroy roads along the bank of the White river, the slippery red clay hills, and 10 miles of black mud to the banks of the Mississippi. This, of course, is portraying the worst conditions, and it would not be advisable to take this road unless you had kept track of the weather in that state and were sure of at least fair roads.

The road from Chester through the southern part of Illinois to Mt. Vernon is also impassable now and will continue so for some time. Arkansas along the river banks, southern Illinois and Indiana have suffered greatly from the swollen condition of the Mississippi and many roads are washed out. It will be a matter of a couple of months before they can be vouched for.

GOING TO NORTH DAKOTA

Genoa Junction, Wis.—Editor Motor Age—I would like the best route from Janesville, Wis., to Grand Forks, N. D. What kind of roads are there and what registration requirements, if any, other than Wisconsin?—D. W. Carey.

Janesville to La Crosse over gravel or macadam roads to Madison, good stone or gravel to Baraboo and the rest sandy or clay, lies through Edgerton, Stoughton, McFarland, Madison, Pheasant Branch, Ashton, Springfield Corners, Sauk City, Prairie du Sac, Baraboo, Abelmans, Reedsburg, La Valle, Wonewoc, Elroy, Glendale, Kendall, Wilton, Norwalk, Sparta, Neshonoc, Salem and La Crosse. At Baraboo you will appreciate a side trip to Kilbourn, the Dells of Wisconsin. You will pass through Delton for Kilbourn.

La Crosse to St. Paul is over a good road and some rolling stretches and after crossing the toll bridge, also two additional bridges into Minnesota, your route through La Crescent, Ridgeway, Witoka, Winona, Stockton, Lewiston, Utica, St. Charles, Dover, Eyota, Chester, Rochester, Oronoco, Pine Island, Zumbrota, Hader, Wastedo, Cannon Falls, Hampton, Empire City, Westcott, and St. Paul. There are excellent roads by way of Como park and

the fair grounds to Minneapolis and is shortest out of seven different entrances to the city.

Minneapolis to Fergus Falls, Minn., routes through Osseo, Champlain, Anoka, Dayton, Elk River, Big Lake, Becker, Clear Lake, Cable, St. Cloud, St. Joe, Avon, Albany, Freeport, Melrose, Sauk Centre, Osakis, Alexandria, Garfield, Brandon, Evansville, Ashby, Dalton and Fergus Falls. The remainder of the trip routes through Elizabeth, Pelican Rapids, Rollag, Hawley, Moorhead, Fargo, Georgetown, Perley, Hendrum, Halstad, Shelly, Neilsville, Climax, Buxton, Reynolds, Thompson, and Grand Forks.

You will have a great variety of roads after you leave Minneapolis. From St. Cloud to Fergus Falls it is hilly, some fair roads and some poor ones, and to the north of Sauk Centre they are sandy. There is a bad stretch of road after you leave Hawley and on into Fargo.

It will be necessary for you to secure a courtesy tag in Minnesota, which is good for 60 days. In South and North Dakota you are exempt. The route book issued by the Minnesota State Association covers the entire trip as outlined.

INDIANAPOLIS HIS MECCA

Centerville, Ia.—Editor Motor Age—Having contemplated a trip to Indianapolis in June, I would like information concerning the best route east of the Mississippi. I am quite familiar with the roads west of the river and have no particular choice as between Burlington, Ft. Madison or Keokuk for a place of crossing.—C. W. V.

If you cross at Fort Madison you will go direct to La Harpe, or if at Keokuk you will first motor through Hamilton, Elvaston and Carthage to La Harpe. The first crossing offers you less distance to travel, but by way of Keokuk you will have a chance to see the construction work at the dam. To reach Peoria you will have a good natural dirt road through the towns of Blandinsville, Bushnell, Prairie City, Ellisville, Fairview, Farmington, Trivoli, Hanna, Limestone and Peoria. En route for Bloomington you will travel over good dirt road interspersed with gravel passing through Groveland, Tremont, Mackinaw, Lily, Danvers and Bloomington.

Champaign to Indianapolis, 126 miles, is over level country on good gravel roads, and the towns through which the Blue Book routes the tourists are Urbana, Homer, Catlin, Danville, Covington, Veederburg, Hillsboro, Waynetown, Crawfordsville, Whiteville, New Ross, Jamestown, Linton, Pittsboro, Brownsburg, Clermont and Indianapolis.

TEXAN WANTS A ROUTE

Whitesboro, Tex.—Editor Motor Age—I should like a route from Whitesboro, to Lincoln, Neb.; also to Evansville, Ind., and Chicago. What kind of roads may I expect?—A. G. Cole.

Cross the Red river at Denniston, Tex.,

and follow the main road to Drake, Okla., Sulphur, Wynnewood, Pauls Valley, Paoli, Wayne, Purcell, Noble, Norman, Oklahoma City, Britton, Edmond, Guthrie, Mulhall, Orlando, Perry, Ponca and Newkirk. In Kansas your route lies through Arkansas City, Winfield, Mulvane, to Wichita.

A trifle longer road from Oklahoma City takes you west through Yukon to El Reno, then north through Kingfisher, Dover, Hennessey, Bison, Waukomis, Enid, Kremlin, Pondercreek, Medford and Renfrow, to the Oklahoma-Kansas state line then through Caldwell, Wellington, Riverdale and Peck to Wichita. Continuing through Kansas you will pass through Newton, McPherson, Selina, Minneapolis, Delphos, Concordia, Belleville, Chester, Hebron, Fairbury, Beatrice and Lincoln. From Hebron another route would take you north to Geneva and Fairmount, then east on the Omaha-Denver transcontinental through Exeter, Friend, Dorchester and Lincoln. Continue on highway to Eagle, Palmyra, Unadilla, Syracuse, Dunbar and Nebraska City, where you cross the river and travel on the Waubesa trail to Shenandoah, Clorinda, Newmarket, Ladoga, Gravity, Sharpsburg, Lenox, Creston, Winterset and Des Moines.

The River-to-River road extends through Mitchellville, Colfax, Newton, Kellogg, Grinnell, Brooklyn, Victor, Ladora, Marengo, South Amana, Homestead, Tiffin, Coralville, Iowa City, West Liberty, Atalissa, Moscow, Wilton, Durant, Walcott and Davenport. The river route through Pleasant Valley, Le Clair, Princeton, La Follett, Camanche leads into Clinton, where you cross into Illinois and head for Chicago via Lyons, Fulton, Morrison, Sterling, Dixon, Franklin Grove, Ashton, Rochelle, Creston, De Kalb, Geneva, West Chicago, Lombard, Maywood, Oak Park, and Chicago.

The best road to follow to Evansville, Ind., is through East Chicago, Hessville, Highland, Hartsdale, Schererville, Crown Point, Orchard Grove, Thayer, Fair Oaks, Aix, Rensselaer, Remington, Wolcott, Montmorenci, Lafayette, Elston, Romney, Linden, Cherry Grove, Crawfordsville, Newmarket, Browns Valley, Waveland, Guion, Judson, Rockville, Mecca, Atherton, Ellsworth, Terre Haute, Sullivan, Paxton, Carlisle, Oaktown, Bruceville, Vincennes, Hazelton, Princeton, Haubstadt and Evansville.

Motor Age calls attention to another route request from your city published herewith and suggests that you travel together. You will find it a great help, and far more pleasant. The route outlined for you is the best, all things considered. It is merely a matter of weighing the road conditions of Missouri and Iowa and then there is no question but that you travel through Iowa. Iowa offers you a choice of four cross roads and any one is satisfactory. If you want running directions, volumes 4 and 5 of the Blue Book will aid you.



Legal Lights and Side Lights

THREATENED BY BLUE LAWS

AS a result of a bill introduced into the Massachusetts legislature last week by Representatives Charles Haigis of Montague there may be an enforcement of the blue laws that will seriously curtail the pleasures of motoring in the Bay State this year. It seems that Representative Haigis was appealed to by some of his constituents in Franklin county who were operating a motor bus line, and who found that some zealous officials there had dug up some blue laws that would prevent the sale of motor supplies or the making of repairs on Sundays.

So Representative Haigis, in order to straighten the matter out, and reasoning that if the laws were enforced in that county nothing could prevent their being enforced all over the state, brought in his bill to allow the operation and repair of cars and the selling of supplies for them on the Lord's day. But the officers of the Machinists and Automobile and Carriage Repairmen's Union called a meeting and went on record opposing the bill and sent their resolutions to the state house. The bill would not affect the members of this union anyway, as they all work in service stations of the dealers and do not have to work Sundays. But the officers of the union thought it might be an entering wedge.

It long has been felt by some of those conversant with the motor industry that if ever any officers should desire to become zealous in the performance of their duties they could stop the sale of gasoline, oils, etc., and the repairing of cars, no matter how simple the trouble was, on Sundays. So this bill, if it does not pass, may call attention to this fact, and if a crusade should be made by some of the state societies who object to Sabbath work, if a man ran out of gasoline or oil, or had a breakdown, unless he could repair it himself he would either have to leave the car by the roadside or push it all the way to a garage.

With work under the ban the garages would have to close up, so it would mean leaving cars by the roadside until after midnight Sunday. As a matter of fact, when Boston has a motor show no cars are permitted to be moved after midnight Saturday until midnight Sunday, so strict are the Bay State laws. Only in emergencies such as a fire could the cars be rolled out.

However, Representative Haigis is one of the strong men of the legislature, and one who was a candidate for speaker of the house this year, being very popular, so it is expected that he may be able to push the bill along. The only thing against it is that it is so late that the rules will have to be suspended to admit it, and at this

late day it is hard to get that point waived, for a few objectors can block it. So far the matter has not got much publicity and it has apparently escaped the Sabbath Day League, but if a few of these organizations start on its trail the path of the motorists may not be strewn with roses in the Bay State in future, for the present legislature has only a few weeks to do things, and if it does not act nothing can be done until next spring.

TRUCK LEGISLATION BEATEN

There will be no hostile legislation to rule motor trucks off the Massachusetts highways or to increase the fees for motor cars at the present session of the legislature, thanks to the publicity that has been given to the manner in which the committee on roads and bridges has been trying to force something into the present session of the legislature.

The bill seeking to increase the fees was twice sent to the senate and twice re-committed back to the committee. The bill aimed at the trucks was passed in and out once. Now that the committee cannot agree to get anything by, and apparently having heard from their constituents and also fellow members of the legislature, the committee did the usual thing in such cases—put in a resolve for a recess committee, not wishing to report no legislation necessary, as that would admit defeat, it is claimed.

ESTATE HAS NO CLAIMS

The supreme court of Wisconsin has handed down a decision that the estate of a person killed in a motor car accident has no cause for damages against the owner or driver of the car. Mrs. Thomas Barlow of Oshkosh brought suit against C. J. Foster for damages for the death of her husband on the ground that the death was caused by the unlawful negligent act of Foster. It appears that Barlow accompanied Foster and others in Foster's car on October 14, 1910, and that Foster turned out for a team, running into a ditch, overturning the car and fatally injuring Barlow. The defense held that Foster was not intentionally trying to wreck his car and seriously injure himself in order to injure Barlow and the trial court upheld the contention.

INSIST ON UNIVERSAL LIGHTS

The Automobile Legal Association has taken steps to see that the present Massachusetts law which requires all horse-drawn vehicles to carry lights at night from 1 hour after sundown to 1 hour before sunrise, the same as motor cars, will be enforced this year. To do this the following letter has been written to the chiefs of police of all the cities and towns of the state:

"Dear Sir—We wish to call your attention to chapter 578 of the acts of 1911, which requires every vehicle on wheels, whether stationary or in motion, on any public highway or bridge, to have attached to it a light or lights, which shall be so displayed as to be visible from the front and rear during the period of from 1 hour after sunset to 1 hour before sunrise, except where street lights are maintained at a distance of 500 feet apart or less.

"This law was not enforced last year, so far as we are aware, and apparently no attempt has been made this year so far to enforce it, which lack of enforcement has already resulted in many serious accidents, and we sincerely hope that, in the interest of public safety, you will take such means as are available to you to enforce this law, in which we shall be glad to co-operate with you in this matter so far as lies in our power."

ELWELL ROAD LAW UPHELD

Constitutionality of the Elwell road law has been affirmed by the Minnesota state supreme court, which gives Minnesota opportunity to build \$6,700,000 of roads at once without adding to state or county taxes. This is based on a bond issue possible to cover the expenditure for 10 years ahead. It is calculated that good roads can be built under this law at a cost of \$112 a year for each quarter section of land benefited. Northern Minnesota projects, under the law, \$2,250,000 of good roads, in a district where there are now few roads. One is from the northern boundary to the twin cities, another from Duluth to the twins. Under the law the county will issue certificates of indebtedness for the whole cost, payable in 1 to 10 years. The state will pay one-half, the county one-quarter and the property one-quarter.

RIGHTS OF FIRE PATROLS

The question of whether a fire insurance patrol has the same rights on the public streets as fire department, police and ambulance cars in Milwaukee is involved in the suit of the administrator of the estate of Louis Schulz against the Milwaukee Board of Fire Underwriters. The estate is suing for \$10,000 damages for the death of Schultz, who was killed by the fire insurance patrol car while riding a motor cycle. The jury at the first trial last week was unable to agree. The court stated that the rules of the road applying to the right of way of fire, police and ambulance cars applies only in part to the insurance patrol, but it was not stated wherein the application differs. The underwriters are operating two motor patrols, a Knox and a Stegeman.

Carbureter Ignorance Not Often Bliss

ONE of the chief causes of carbureter trouble is an effort on the part of the driver or operator to adjust that device, when the source of trouble arises elsewhere. One often works on the carbureter when he does not know the air adjustment from that of the needle valve or whether the motor is getting too much air or not enough; or, in other words, when one is ignorant of the mechanical construction and physical function of the device.

There is a set of troubles which is well known to all experienced drivers and repairmen, a sort of standard group of troubles directly or indirectly connected with the carbureter, with which the best of cars driven by most intelligent operators often are afflicted at some time. Some of these Motor Age will enumerate with respect to cause and effect.

Resume of Carbureter Ills

It often occurs that the motorist requires not so much to be informed as to be reminded. A resume, therefore, of the common causes of carbureter trouble may be of value. Ordinary motor troubles generally are of three kinds: Either the engine will not start, it runs irregularly, or it runs regularly but with a noticeable falling off in power.

IF THE ENGINE WILL NOT START

No gasoline in fuel tank.
Fuel tank valve may be shut off.
Carbureter needs priming.
Motor cold, cylinders need priming.
Vent hole in tank cap closed.
Cylinders may be flooded, over primed.
Water in carbureter.
Filter clogged or full of water.
No pressure in fuel tank.
Pressure valve or pump out of order.
Leak in pressure valve.
Spraying nozzle of carbureter clogged.

IF THE ENGINE RUNS IRREGULARLY

If the engine runs irregularly, misses regularly or irregularly, or will not slow down:
Air leak around spark or cylinder plug.
Air leak around inlet valve stems.
Air leak around inlet manifold gaskets.
Hole in manifold itself.
Water in carbureter.
Carbureter out of adjustment.
Auxiliary air valve spring weak.

IF ENGINE OVERHEATS, LOSES POWER

Fuel level in float chamber too high.
Spraying nozzle opening too large.
Float mechanism out of order.
Float punctured, contains fuel, too heavy.
Float soggy, soaked with fuel, too heavy.

Assuming that the engine will not start, and running the eye down the list an examination of the fuel tank will readily show whether or not it contains fuel; whether or not the fuel tank valve is shut off and also if the vent hole in the tank cap of a gravity system is closed. The carbureter may be primed and an effort made to start the motor to ascertain if this is the cause of the difficulty. If the cylinders have been primed considerably, they may be flooded, and the proper course is to close the throttle, open the pet cocks and spin the motor with the ignition turned on until an explosion occurs, then close the pet cocks and the motor should start readily.

If water in the carbureter is suspected one has but to open the pet cock at the

Common Failing of Driver is to Ascribe His Troubles to Fuel-Supplying Device, When Disorder Arises from Some Other Source—Some of the Why's and Wherefore's

By George W. Gaidzik

bottom of it and drain out a few ounces of its contents. Should the filter be suspected it should be drained and if the flow therefrom is hindered it should be opened and the strainer renovated. In a pressure-feed fuel system the pressure gauge should show whether or not there is pressure in the tank. Should there be no pressure, the valve may be clogged, or if a pump is employed, it may be out of order. There also might be a leak in the pressure valve or its connection, or in any of the other connections between the valve and the tank.

If the carbureter does not flood and the fuel leaks not therefrom when priming lever is operated then the spray nozzle of the carbureter may be clogged or the needle valve, if there is one used, may be shut off. If the engine runs irregularly an air leak around the spark or cylinder plugs may be found by applying oil around them. An air leak around the inlet valve stems may be discovered by holding a large piece of waste or cloth saturated with gasoline, around their openings while the motor is in operation. An air leak around the inlet gaskets or in the manifold itself may be discovered in the same manner. Draining the carbureter generally will remove any water therefrom, but if convenient it might be well to remove the float therefrom and thus be assured that it is clean. If the air-valve spring of the carbureter is too weak it must be adjusted either by means of the adjustment provided or by stretching it or by fitting a new spring.

Float Chamber May Be High

In case the motor shows a noticeable loss of power or overheating occurs, the carbureter will generally flood if the fuel level in the float chamber is too high; if the opening in the spraying nozzle is too large, adjustment of the needle valve is required or a new nozzle must be fitted. When flooding occurs with a metal float that is punctured the puncture may be due to wear where the float rests on its operating levers or a part of it may have become unsoldered. A little fuel, therefore, may have leaked into the float making it less buoyant and the remedy is to dry the float out thoroughly by placing it in an oven and then soldering it tightly. When a cork float becomes soaked with fuel it should be dried out in a similar manner and then given a coat of shellac or a new float replaced.

First, it should be remembered that

there are only three kinds of carbureter troubles which interfere with the proper running of a motor—a mixture that is too rich, a mixture that is too poor, or no mixture at all. A rich mixture is one in which the proportion of gasoline abnormally exceeds the amount of air. It may be due to faulty adjustment of the float or air valves, clogs in the pipe, dust on the air pipe screen, leaky float valve, or to a so-called water-logged float, as in cases of soggy cork, or punctured metallic float.

A mixture is poor when it contains too much air and not enough gasoline, a condition often due to a faulty adjustment of the float or air valve, a leak in the inlet pipe, the supply cock partly shut off, the spray nozzle float valve or feed pipe partly clogged, or water in the gasoline.

There is no mixture at all when the spray nozzle, float valve or feed pipe is clogged, when the gasoline tank is empty, when there is no air pressure, or when the supply cock is shut off. These are the major causes.

An overrich mixture will cause a motor to overheat and thereby give rise to a number of troubles such as: preignition, accumulations of carbon on the pistons and cylinder heads, steaming radiator and loss of power. A poor mixture will make the motor miss when running idle at slow speeds, and at high speeds it will not only cause misfiring but the missing will be accompanied by coughing and popping in the carbureter.

Many difficulties will often occur owing

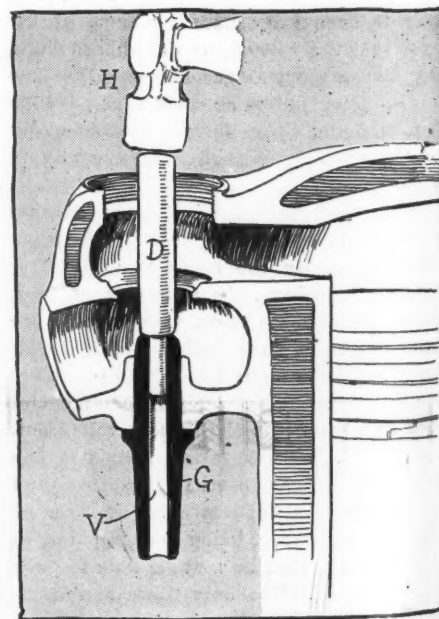


FIG. 1—REMOVING A VALVE GUIDE

Diagnosis of Ailments of the Motor

Only Three Kinds of Carbureter Trouble Can Occur: Mixture Is Too Rich, It Is Too Poor or There Is No Mixture at All—Advice to Owner as to How to Act

to a lack of pressure in the supply tank. In a pressure feed system, for instance, there will be a lack of pressure in the tank if the strainers in the air line become choked with soot, if there be a leak in the line due to a hole, a loose joint, or a defective gasket, or an obstruction on the valve seat; or, as in some cases where the air pressure is taken from the exhaust, when the cutout is left open the exhaust is particularly free and there is not enough pressure available to overcome the tension of the check valve spring. In gravity-feed systems trouble has arisen in climbing hills whose incline was so steep as to bring the carbureter below the level in the supply tank. There also are cases where the vent in the filler cap has become stopped and caused much distress.

Flooding is a troublesome feature of some carbureters and it may be due to a number of causes: Foreign matter may prevent the float valve from seating, water-logged or ill-adjusted floats and slight derangements of the levers communicating between the float and valve also are common causes.

Throttles and their operating mechanism often give rise to trouble. Control levers become worn, loose or disconnected, butterfly valves sometimes loosen up, making control of the mixture impossible; automatic control devices when tampered with are apt to give trouble owing to the universal ignorance of their construction and operation. Another trouble very apt to be encountered by the tourist is caused by

the difference in qualities of gasoline obtainable in various parts of the country. Gasoline sold in small towns often is very poor, having become stale from long standing, or being adulterated with water. A carbureter that is adjusted for a high quality of gasoline will operate very poorly on a heavier grade regardless of what adjustments are made, but generally with the proper adjustments and treatment a motorist will be able to get along fairly well with a comparatively poor grade of gasoline if he is capable of realizing that his trouble is caused by that and by nothing else.

One of the most common causes of misfiring and consequent loss of power is poor compression; still there are thousands of motorists who never dream of testing the compression of their motors when trouble of the above nature occurs. This should not be, for the compression is much easier to test than the carbureter or the ignition apparatus. To test the compression of the motor one has but to crank it slowly and note the comparative resistance of each cylinder and the resistance of all in general. If the resistance or the compression of one or more cylinders is comparatively poor, under ordinary conditions the valves of those cylinders need grinding. If the resistance of all of the cylinders is not up to the regular standard, then, perhaps, all require regrinding. A leak through one or more valves generally is accompanied by misfiring and loss of power. A slight leak through all of the valves is accompanied by loss of power, but often without misfiring.

When a motor begins to misfire suddenly from some unknown cause the first thing a driver should do is to note whether the firing is regular, that is, if it occurs in only one or two cylinders at regular intervals in the cycle of explosions; or, if it is intermittent in one cylinder or apparently in different cylinders. A regular misfire in one cylinder, that is, misfiring that occurs once at the same time in every cycle of the motor, generally is caused by a defective plug or a disconnected high-tension wire. A defective valve also is probable. Intermittent misfiring in one cylinder may be due to a defective plug or loose terminal connection or a valve that is not closing tightly.

Causes of Motor Misfiring

Of course there are many other causes of motor misfiring, but the object of these suggestions is to impress upon the reader the necessity of a little forethought in dealing with motor troubles. One should

always try to figure out the possible cause of a trouble before looking for it. An adjustment never should be changed without a knowledge of why the change is made, the effect the change should have and how to restore the mechanism to its original adjustment.

When the possible cause of trouble cannot be imagined, then begin with a careful examination of all the features of the motor that are apt to give rise to the trouble. If nothing out of order is found then begin testing out the various features, beginning with the easiest and most accessible and thoroughly complete each test before starting on another possible cause. For example: If your ignition system is suspected, the easiest thing to test would be the spark plugs, first find the faulty plug, then proceed from the spark plugs to the wiring communicating between the plug and the magneto, then examine the battery connections, the switch connections and, last of all, the adjustments of either the coil or magneto.

Do not examine a spark plug and then leave it and try a few carbureter adjustments and later come back for another spell of tinkering with the ignition, etc. If you suspect the ignition system, go to it from beginning to end in a systematic manner before proceeding with the carbureter. And when you have started on the carburetion system, stay with it until you have made sure of the operation of every feature of it between the engine cylinder and the fuel supply.

An Example Cited

As an example of how a very little thing spoiled the evening for a party of motorists, caused the driver of the car much perplexity and weakened the owner's confidence in the driver, the following episode may be of value: The owner had given his driver instructions to have the car put in good shape for a certain evening.

Plenty of time was allowed so that the valves were ground, the spark plugs of the make-and-break system were cleaned and adjusted, the oil was drained from the motor and a fresh supply put in, all ignition wires and connections were carefully adjusted, and all parts of the car were inspected, adjusted and oiled. Then the car was taken out for a little run to make sure that everything was running sweetly and ready to give good service. The driver really had made a conscientious effort to have the car in A-1 condition.

When the motoring party started out in the evening everything ran smoothly until after a run of several miles and a stop had been made for an hour or so. When the motor was restarted the throttle was raised a little higher than usual and the

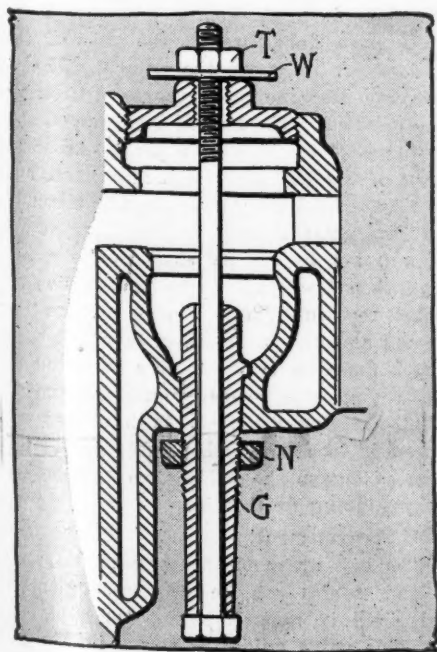


FIG. 2—REMOVING A VALVE GUIDE

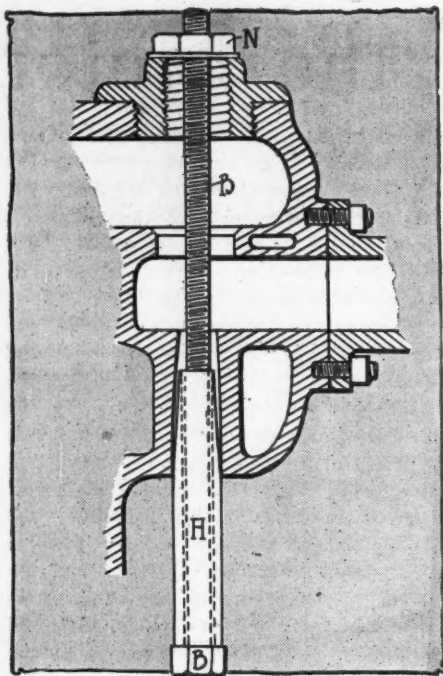


FIG. 3—DRAWING GUIDE INTO PLACE

motor raced for a few seconds before the throttle could be retarded. On retarding the throttle an unusual misfiring occurred. Not wishing to delay the party, however, and believing the motor would right itself in a minute or so, the car was started. The motor hardly had power enough to drive the car and it became necessary to stop while the driver got out of the seat to examine the motor which had been left running. The hood was raised, but everything seemed in good order. The ignition mechanisms seemed to be working properly, the carburetor adjustment changed and then brought back to its original adjustment without any apparent improvement; then the motor was stopped while the make-and-break spark plugs were removed and found to be in good shape. The driver had tested everything he could think of and then turned to the owner and suggested that the party take the street car, which they did. The driver then repeated the tests he had made but with no better results. A group of spectators had gathered around, among whom were several taxicab drivers who expressed their sympathy with the driver by cursing the make-and-break system employed. One of the onlookers who had been watching the operations from the start then asked the driver if he had tested the compression. He had not and proceeded to do so immediately. One of the four cylinders was absolutely dead, so to speak; it had no compression whatever. By having one of the taxi drivers crank the motor over slowly while he watched the movement of the valves the driver soon located the cylinder with the weak compression and also found that one of the inlet valves was stuck in a wide open position. A screwdriver was used to push downward on the valve spring and the valve snapped shut.

The motor then was started and ran

with the utmost regularity until the driver again opened the throttle wide and raced the motor, when the misfiring again took place, even when the throttle was retarded. A glance at the valve showed that it was stuck in the open position in the guide. The onlooker who had previously made the suggestion about the compression again came to the front and asked if the valves had recently been ground in, and being assured that they had, suggested that the valve stem might have been bent in removing or replacing it and advised that if the driver were to keep from running his motor at a high rate of speed he undoubtedly could drive the car without further trouble until the valve stem could be straightened or a new valve put in. This proved to be another good tip.

Old Motor Gives Trouble

After a motor has been used for 2 or 3 years it may be found difficult to adjust the carburetor so that the motor will run steadily at slow speeds without misfiring. The misfiring might not take place when the car is running slowly and the motor working hard, but when the load is light or the motor running idle the misfiring may be very annoying and most difficult to locate. This often is due to the admission of air into the fuel mixture from around the valve stems, the guides having been worn either from long service or from carelessness on the part of the operator or repairman during the valve-grinding operations.

It is very necessary that care should be taken in grinding in the valves to see that none of the abrasive is smeared on the valve stem or runs down the valve stem into the valve guide. Precautions also should be taken to clean the guides and stem after the grinding-in job is finished and the valve finally assembled into place. Unless these precautions are taken, unusual wear will take place between the stem and guide and they soon will fit so poorly that considerable air will be admitted between the stem and the guide.

To remedy trouble of this kind one either must provide some means of packing

the end of the valve guide, fit new valves with larger stems, or more preferably fit new guides. New guides may be readily obtained from almost any dealer or from the manufacturer and but little fitting is necessary to replace them. In some motors the guides are threaded into the cylinders, but in most types they are simply pressed in. To remove the threaded guides it is necessary to use a wrench to loosen the nut that holds them in place, but the guides that are a pressed fit in the valve chamber may be very easily removed as indicated in Fig. 1.

A drift D having its lower end constructed so as to fit the bore V of the valve guide G is applied as shown, then a few sharp blows with the hammer H should force the guide out of the cylinder. The new guides may be replaced in the same way if the cylinders happen to be removed from the crankcase; but if intact it may be impossible to use the drift advantageously, so the method illustrated in Fig. 3 is recommended. A long bolt B extending through the guide H and up through the spark plug hole in the valve cap or through a suitable plate with a hole in it through which the bolt may pass, has a nut at its upper end which when screwed to the right, or drawn down, serves to draw the guide up into place. This is an easier and safer method than the use of the hammer and drift. The taper of the guide hole in the valve chamber is of course greatly exaggerated in the illustration.

In Fig. 4 is illustrated a method of bushing a valve guide. The hole in the guide has been bored out so that the bushing B, which is made from seamless steel tubing about $\frac{1}{8}$ inch thick, can be fitted into place. Having made the bushing it is best drawn into place in the same manner as recommended for drawing an ordinary guide into place, by means of a long bolt and nut. When the bushing is in place it is customary to secure it by drilling a hole through the side of the guide, say at about the point D, Fig. 4, making just the point of the drill enter the bushing. The hole is then tapped and a little set screw with a point similar to that of the drill is screwed into place. The set screw itself may be secured by a couple of prick-punch holes. This set screw should not be cut off close to the guide and then filed flush as is the practice of some repairmen, for it may require removal at some future time, in which case much unnecessary labor may be saved if the set screw is readily found and removable. Having fitted the bushing and secured it into place, the inside should be reamed out so the valve stem may be an easy running fit therein.

Bolt Arrangement

The bolt arrangement showing in Figs. 3 and 4 also can be very conveniently employed in removing some types of removable valve guides as shown in Fig. 2. This is a sketch of the type of guides

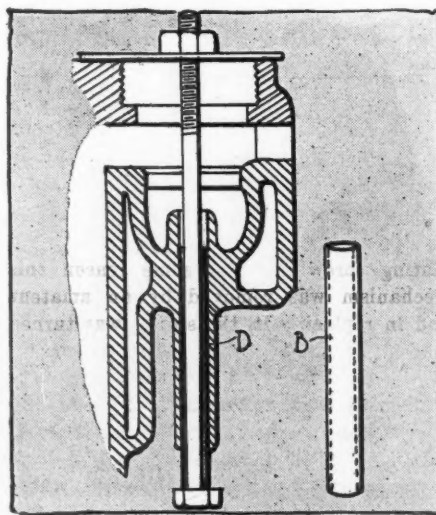


FIG. 4—DRAWING BUSHING INTO PLACE

used on Pierce-Arrow motors. To remove guides of this character it is but necessary to first remove the nut N and start the guide G by simply turning down on the nut T. The usual washer or plate W being employed in this case to protect the end of the valve cap retainer which is screwed into place. Having loosened the guide it remains but to remove the valve cap retainer, take out the guide, replace it with a new or unworn one, replace the nut end and draw it up tightly.

When using a hammer about the cylinder castings of an engine, such as in driving new guides into or out of place, it is advisable to use either a lead or copper hammer, or to employ a block of wood or soft metal to protect the end of the guide from the hard surface of a steel hammer.

In Fig. 6 is shown the means employed by many repairmen for regulating the float level in a carburetor. It consists of a can with a wire handle, a piece of copper tubing soldered to the bottom of the can to form an outlet, a piece of rubber tubing, and a nipple or short piece of metal tubing with a coupling adapted for attachment to the carburetor. In regulating the float level of the carburetor several adjustments of the nuts on the float valve generally are required before the proper level is attained and as each adjustment must be tried the carburetor must be repeatedly drained and refilled with fuel; hence, a suitable means must be provided for conveniently draining and refilling.

Uses of the Float

Before the float of any carburetor can be properly adjusted the operator must familiarize himself with the use or purpose of the float, its co-operation with the valve which admits or stops the flow of gasoline into the float chamber, and the relation between the float chamber and the spraying nozzle. He must know that, as the gasoline flows past the valve into the float chamber of the carburetor the float should rise as the level of the fuel rises, and as the float rises it automatically closes the valve and so regulates the flow of gasoline into the float chamber. He also must know that the level maintained in the float chamber is the same

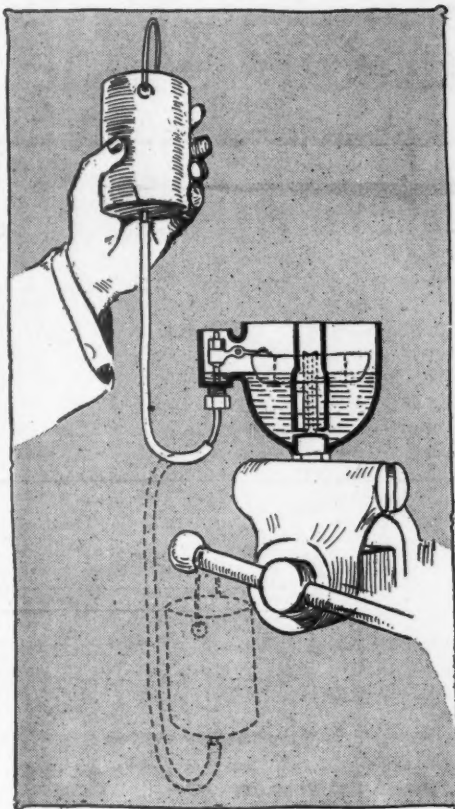


FIG. 6—ADJUSTING FLOAT LEVEL

as that which is maintained in the spraying nozzle; and that the required level which is to be maintained in the spraying nozzle must be known in order to determine the proper float level.

Owing to the variation in the suction of different motors on a carburetor it often is found that a slight variation of the fuel level or a slight change in the size of the spraying nozzle will add greatly to the efficiency of the motor. The first thing to do then before attempting the adjustment of a float is to learn whether or not the float needs adjustment.

Errors in the assembly of component parts of the carburetor are quite common in some of the older types of carburetors in use, but not so likely to be found possible in the more up-to-date constructions. A ludicrous error which was the cause of much trouble is shown in Fig. 7, which represents the air valve of a carburetor. The valve is held on its seat by a spiral spring which allows the valve to open automatically as the suction overcomes the tension of the spring. In order that the tension of the spring may be adjusted its apex A is designed to rest on the adjusting screw S. For some reason this mechanism was removed by an amateur and in replacing it, the spring was turned around as shown by the dotted outline. This, of course, rendered the valve non-adjustable and caused much trouble and loss of time before it was discovered.

In Fig. 5 is shown what happened to a perfectly innocent carburetor whose owner had not been careful enough in disassembling the apparatus to note the rela-

tive positions of the parts to be assembled. This carburetor had for many months given good service but suddenly there developed a tendency on its part to flood when the car was standing idle. After pondering over the various theories as to why the carburetor should flood, the owner came to the conclusion there was an accumulation of dirt around the needle valve in the float chamber. Removing the carburetor from the motor and quickly disassembling it the cause of the trouble was exposed; there was an accumulation of dirt around the needle valve. Needless to say, the owner was satisfied with his power of diagnosis, so the carburetor was thoroughly cleaned up, assembled and placed on the motor with the float placed in the reverse position as designated by the dotted lines in Fig. 5.

Amateur Had Reversed Float

After properly making all connections he turned on the gasoline and allowed the float chamber to fill up. The top of the float chamber remained motionless and the tendency to flood was even more marked than before. It was plain that the float was not working; so, turning off the gasoline and again removing the cover of the float chamber the float was carefully examined, then replaced in the same way. The valve and its mechanism was also closely scrutinized and tested and the parts again assembled and the gas turned on. Still the flooding continued. Having devoted a reasonable amount of time to this phenomena the owner took the car to the repairman, who after a few questions and casual examination, removed the cover of the float chamber, took out the float, turned it over, replaced it, turned on the gasoline and there was no more flooding.

In closing, a few words on the difference between priming and flooding a motor with gasoline may be appreciated. Priming a gasoline engine is one thing and flooding it is another. Priming an engine is to inject a rational charge of gasoline into the cylinders to assist starting. Flooding a motor is to inject more gasoline into the cylinder for the same purpose. The great difference lies in the results. Prim-

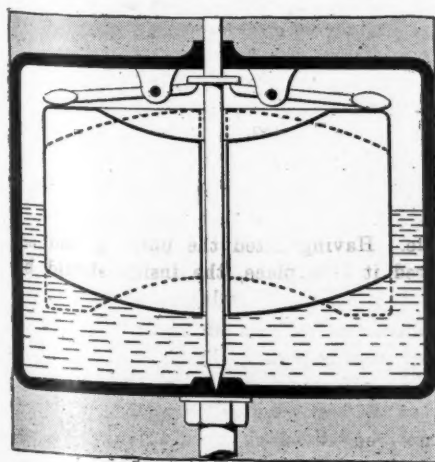


FIG. 5—TROUBLESOME INVERTED FLOAT

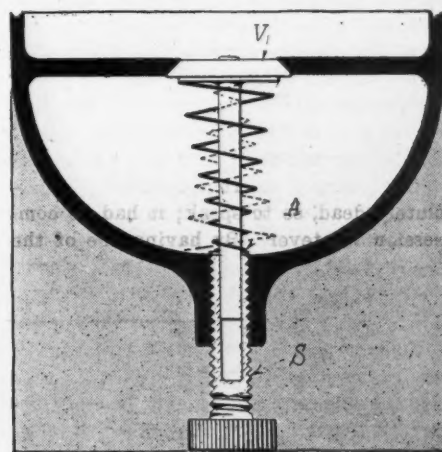


FIG. 7—AN INVERTED VALVE SPRING

Rayfield Carbureters Made in Two Types

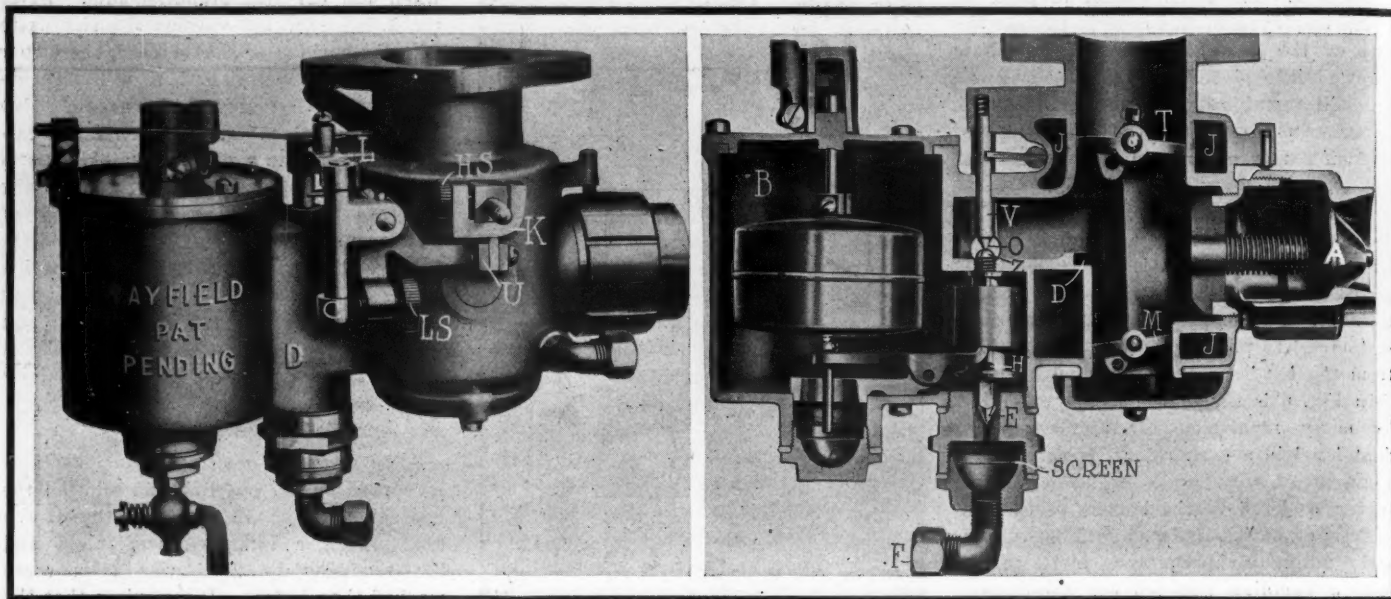


FIG. 8—SIDE VIEW RAYFIELD MODEL H, SHOWING ADJUSTMENTS. FIG. 9—SECTIONAL VIEW OF RAYFIELD

ing a motor generally makes starting easier, especially in cold weather or when a poor grade of fuel is used. Flooding makes starting harder and often impossible. A case comes to mind where a motorist who, after starting his car every morning for several months by simply turning the crank three or four times, found it necessary one morning to send for an expert after having tried in vain for an hour to start the motor. "Well, what is the matter?" asked the expert on his arrival. "Haven't the least idea," answered the motorist. "First time she has ever balked like this. I came down this morning, turned on the gasoline, flooded the carburetor, turned on the switch, and gave her the usual two or three turns, but she failed to start. I put a small quantity of gasoline into each cylinder and tried again, still there was no sign of a start. Injecting another dose into the cylinders, I turned the engine over quickly fifteen or twenty times. While injecting some more gasoline into the cylinder, I happened to think that my battery was being charged and the switch lever was on the wrong side. On swinging the lever onto the dry cells, however, she still failed to respond. I examined the spark which was good, found the timing correct, again flooded the carburetor, but as yet I haven't had one explosion. Now, it is up to you." The expert removed his coat, opened the priming cocks, closed the throttle valve of the carburetor, turned the motor over rapidly about twenty-five times, when several faint explosions occurred in the cylinders. Closing the priming cocks and opening the throttle slightly, the expert then pulled up on the crank and the engine started just as if nothing had happened.

One Is Waterjacketed and Other Is Not—How Adjustments Are Made

RAYFIELD carburetors are made by the Findeisen & Kropf Mfg. Co., Chicago. There are two types of Rayfield carburetors, which differ only in that one, the model D, is waterjacketed, and the other, model H, is not. The model D carburetor

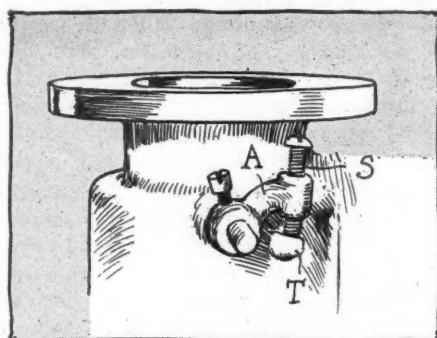


FIG. 10—RAYFIELD THROTTLE STOP

reter is made in four stock sizes: $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$ and 2-inch; and in two special sizes: $2\frac{1}{2}$ and 3-inch. Model H is made in but three sizes: 1, $1\frac{1}{4}$ and $1\frac{1}{2}$ -inch.

These sizes, together with the wide range of adjustment obtainable with the many different sized spray nozzles provided, render the Rayfield carburetors applicable to all types and sizes of gasoline motor car engines. The spray nozzles are furnished in thirty-eight sizes, varying from .0310 to .1285 inch in diameter, or according to the standard twist drill sizes ranging between Nos. 68 and 30.

The Rayfield carburetor is shown in section in Fig 9; and its feature of construc-

tion and operation is the combination of a variable needle valve V, automatic air valve A and additional mechanical air valve M, the latter being connected to the throttle valve above it as illustrated.

In operation, fuel is admitted to this carburetor at F, and passing the needle valve E, enters the float chamber B. When the required level is reached in the float chamber, the float having been raised, allows the needle valve E to descend and stop the entrance of fuel. Fuel from the float chamber enters the spray-nozzle Z through the holes H. The constant or fixed air supply enters the carburetor through the opening O, which is so arranged that the entering air currents passes directly over the nozzle Z and draws the fuel therefrom. The flow of fuel from the nozzle is regulated by the needle valve V which is connected to the throttle valve T, so that when the throttle is opened the needle is raised proportionately. A notable feature shown in this illustration is the formation of the dam D, which, when the carburetor is primed by depressing the float so that fuel overflows from the nozzle, causes a puddle to form that enriches the mixture and facilitates starting. It also may be noted that the mechanical air valve M is set below center so that it does not start to open until the main throttle valve is about one-quarter open; then it automatically opens and admits more air to the mixture. The automatic or auxiliary air valve A is controlled by the suction in the carburetor and by two springs, a light one for low speeds and a heavy one for high speeds; these are so arranged and adjusted that the low speed adjustment never is disturbed by the high-speed adjustment.

To adjust this carburetor, it is customary to first set the automatic air valve A so

Rules Spark Plugs Are "Printed China"

that it is unscrewed about $\frac{1}{8}$ -inch; and see that the lever L is in the neutral position with the cam C out of contact with the screw behind it. Close the needle valve by turning the low speed screw L S, Fig. 8, to the left, unscrewing it, until the arm U just begins to leave contact with the cam K; then turn it to the right one and one-half turns; numbers are provided on the back of the screw head to guide you in giving the required number of turns. Next open the throttle about one-quarter, prime the carbureter, and start the motor. Close the throttle until the motor runs slowly without stopping, then turn the low speed screw L S to the left one notch at a time, until the motor runs slowly and smoothly without load. If the motor does not throttle low enough turn the screw S in the stop arm A, Fig. 10, to the left with a screw-driver. The stop arm is on the opposite side of the carbureter from that shown in Fig. 8. When the low-speed adjustment has been obtained, run the motor until warm.

Then test the low speed adjustment by pressing in the automatic air valve A very slowly and carefully with a pencil or with a finger. If the motor speeds up, the mixture is too rich and can be improved by unscrewing the low speed adjusting screw L S a few notches until the motor just begins to slow down. The low speed adjustment then is about right.

If these instructions fail to give the desired results, test the compression, with a gauge if possible, otherwise, by cranking the motor over very slowly by hand and carefully noting if the pressure in each cylinder, or the resistance to cranking over center, is the same with each cylinder. Also bear in mind that air-leaks, in the inlet manifold or any of the connections, or past the valve-guides, or piston rings, or around the spark or cylinder plugs, all are apt to spoil the mixture sufficiently to cause misfiring that cannot be overcome through adjustment of the carbureter. Water in the float-chamber also will give trouble; and faulty ignition is rarely cured by carbureter adjustment.

Having obtained the low-speed adjustment, open the throttle rather quickly to see if the motor picks up readily, or snap-pily. If it pops back into the carbureter, screw up or turn the high-speed adjusting screw H S to the right, until the motor responds to the throttle without popping. If the high-speed screw does not stop the popping before it has been screwed all the way in, the spray nozzle of the carbureter is too small, and a larger one, readily obtainable from the factory or any of its branches, should be fitted. For intermediate speeds, with the throttle about $\frac{1}{4}$ open, should the motor backfire, turn the air valve adjustment P to the right a turn or two, thus increasing the spring tension and decreasing the quantity of air slightly.

United States Court of Customs Appeals Decides on Dutiable Classification

WASHINGTON, D. C., May 18—An interesting decision relating to the dutiable classification of spark plugs has been rendered by the United States court of customs appeals in the case of Richard & Co. vs. United States. The collector of customs at New York assessed the merchandise at 60 per cent ad valorem as "china printed" under the provisions of paragraph 93 of the tariff act of 1909. The importers protested that the spark plugs were china and other wares, not printed, ornamented or decorated, and they were dutiable at 55 per cent ad valorem under the provisions of paragraph 94 of said act. The board of general appraisers decided the spark plugs were enameled and overruled the protest. The importers then appealed to the court of customs appeals.

On the hearing the importer testified the spark plugs were porcelain and that

they were imported for the Rajah Motor Supply Co. He further stated that the words "Made in Germany" were put upon the article for the purpose of complying with that part of section 7 of the tariff act which requires that all imported articles shall be marked with the country of origin, and that the word "Rajah" was placed upon the plugs to protect the trademark of the Rajah Motor Supply Co., which was "copyrighted." The court's ruling was in effect as follows:

"'Enameled' as employed in paragraph 94, tariff act of 1909, has the limited meaning which it appears always to have borne in ceramics; that is to say, an opaque or colored semi-vitrified coating applied to the surface of pottery as a decoration or for a utilitarian purpose. The merchandise of the importation could be classed as enameled only by an expert, for the true nature of its finish is unapparent to the eye of a layman. However, the contention is made that the merchandise is printed china. The testimony to the effect that the word Rajah appearing on the goods was put there to protect a registered trade-mark or that the word Rajah was a trade-mark at all, is too weak, vague and uncertain to overcome the presumption of correctness attaching to the collector's decision. The spark-plugs were properly held dutiable as 'printed china.' The board's decision is affirmed."

A ruling has been made by the treasury department to the effect that the regulations of November 27, 1907, providing for the allowance of drawback on motor cars manufactured by Brewster & Co., of New York, with the use of imported materials and parts, shall be extended, so far as applicable, to cover the exportation of motor cars manufactured by the Benz Auto Import Co., New York.

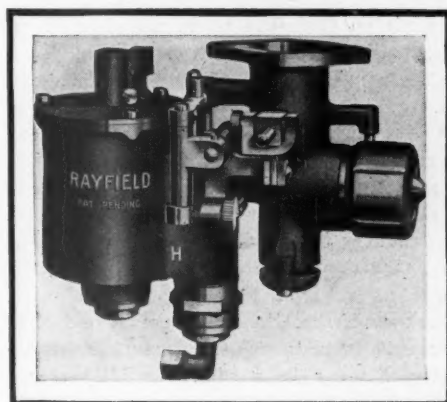


FIG. 11—RAYFIELD H CARBURETER

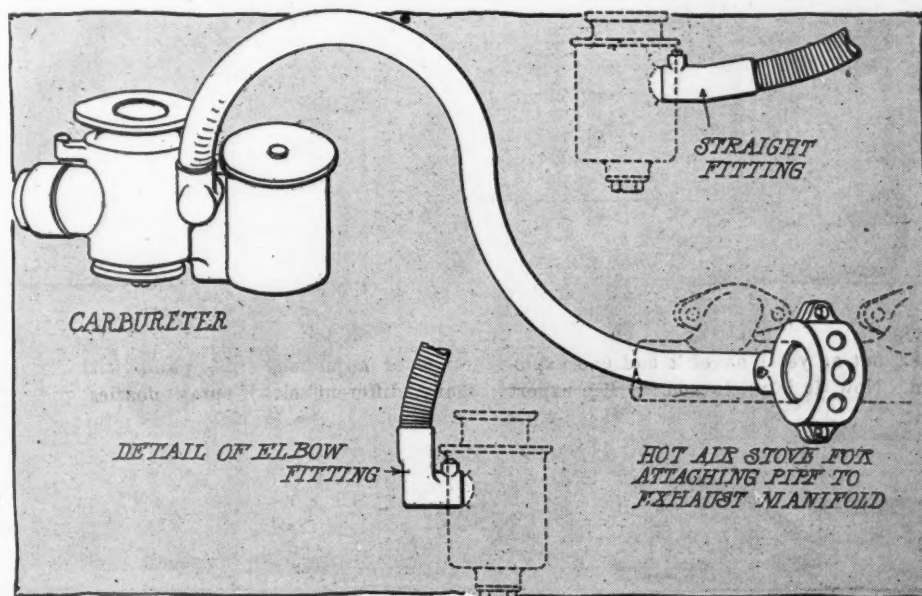


FIG. 12—HOT AIR CONNECTION PROVIDED FOR INLET TO RAYFIELD CARBURETER



The Readers' Clearing House



Coasting With Worm-Drive—Construction of Pierce-Arrow Final Transmission Not Irreversible —Angularity of Threads in Gears Determines Ability to Convey Power in Both Directions—Fuel Efficiency of Cars

ST. LOUIS, Mo.—Editor Motor Age—Can the Pierce-Arrow worm-driven truck coast; and if so, how is this accomplished since worm-gearing is irreversible?

2—How many miles per gallon of gasoline do the respective manufacturers claim for the following cars: Pierce-Arrow, Peerless, Packard, Locomobile, Oldsmobile, Lozier and White? By this I mean for their highest powered models only.

3—How is the carbureter adjusted on the Pierce-Arrow 1912; and also on the 1911 Marion 30?—E-H-K.

1—Yes, the Pierce-Arrow worm-drive truck can coast, and very readily, too. There is very little difference in this respect between the operation of a well designed worm-driven truck and a bevel-gear driven one; but the worm-drive does give a slight impression of sluggishness on starting from rest, or when coasting down hill; there is a perceptible braking action. The difference, however, is a slight one, and not to the disfavor of the worm, as the general effect is somewhat softer and more like the operation of a steam than a gasoline vehicle. The irreversibility of worm gearing depends almost entirely upon the relative angularity of the threads. This is quite clearly indicated in Figs. 2 and 3. Fig. 3 is a sectional drawing of the Pierce-Arrow worm-drive mechanism, and the angularity of the driving worm is indicated by the arrow; whilst Fig. 2 is a similar view of the

Warner so-called irreversible steering mechanism with the angularity of its driving worm also indicated by an arrow for the sake of comparison. The steering mechanism is not absolutely irreversible, but sufficiently so to serve its purpose. Owing to the slighter angularity of the steering-gear-worm threads, considerably more power would be required to transmit power from the larger worm wheel back through the small worm pinion; and the angle is designed to overcome any possible tendency of the steering wheels to be deflected from their course, on striking ruts or stones and the like in the road. With an angle in the neighborhood of 45 degrees as in the worm-drive axle, a little study of the action of the co-operating surfaces will show that except for the differences in leverage, it should be almost as easy to drive back through the pinion from the worm wheel as from the pinion through the worm wheel.

2—Manufacturers of motor cars generally are reluctant to make claims regarding the fuel consumption of their cars, because of the unnecessary trouble it stirs up among the users of their products. For instance, one owner in a certain part of the country where the roads are very good, and who drives his car with considerable skill as regards the operation of the spark and throttle, may get a mileage per gallon far in excess of another owner using his car in a sandy or hilly terri-

tory, and operating his spark and throttle levers with poor judgment. Another may have his carbureter properly adjusted and get several miles per gallon more mileage than one with a poorly adjusted carbureter. The following claims are made by Chicago agents of the above mentioned cars, in ordinary service, and without exaggeration: Pierce-Arrow, 7 to 8 miles per gallon; Peerless 6-48, between 7½ and 9 miles; Packard 6, 8½ to 9 miles; Locomobile 6, 10 to 12; Oldsmobile 6, 7 to 8; Lozier, 10; White, 10 to 12. These are claims that would be made and demonstrated to the prospective purchaser.

3—Fig. 1 shows a section through the automatic Pierce-Arrow carbureter. The constant level gasoline chamber is concentric with the spray nozzle. This chamber is in communication with the gasoline supply tank which is on a higher level. The float A is annular; and it serves to keep the height of the gasoline at the spray nozzle constant at whatever normal inclination the car may stand and regardless of the amount of fuel in the gasoline supply tank. This height should be ¼ inch below the top of the nozzle, whose opening is regulated by the adjustable needle valve B. When the gasoline gets below this level the float drops, raising by means of a lever the float valve C, thus allowing the gasoline to fill up the chamber to its proper level.

The gasoline from the fuel supply tank passes through the fine gauze strainer D. This prevents water and dirt from entering the float chamber. The strainer is secured to the plug P and this plug should be withdrawn occasionally to allow the water and dirt to be drained off. There is also a drain cock at the end of the pipe leading to the carbureter which should be opened once a month for a few seconds to drain off any water that may have accumulated therein.

When the engine is running slowly, the throttle valve E is just barely open, and the auxiliary air reed valves F are on their seats. All the air is taken in at the lower inlet, and coming from the proximity of the exhaust pipe it is warm. It passes up the contracted passage around the spray nozzle at a high speed and so vaporizes the gasoline which is drawn from the nozzle. When the engine runs faster the more intense suction opens the light auxiliary reed valve F, admitting air above the spray nozzle. When the engine runs still faster a heavier reed valve G is open, admitting still more

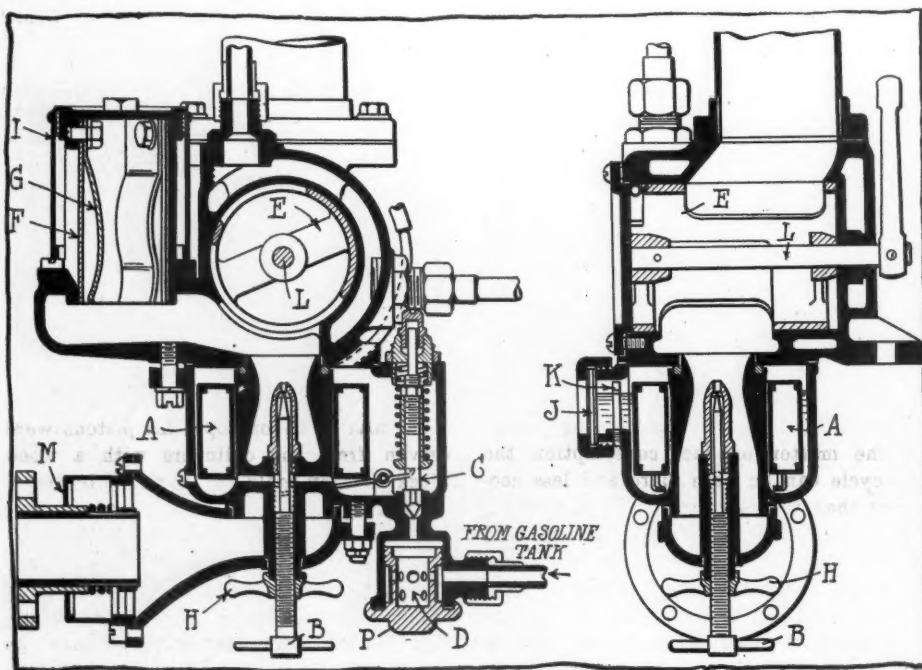


FIG. 1—SECTION OF PIERCE-ARROW CARBURETER SHOWING ADJUSTMENTS

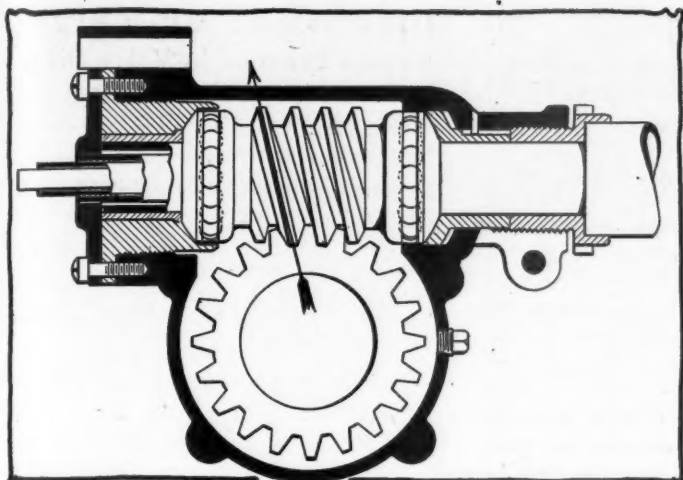


FIG. 2—WARNER WORM-AND-GEAR STEERING MECHANISM

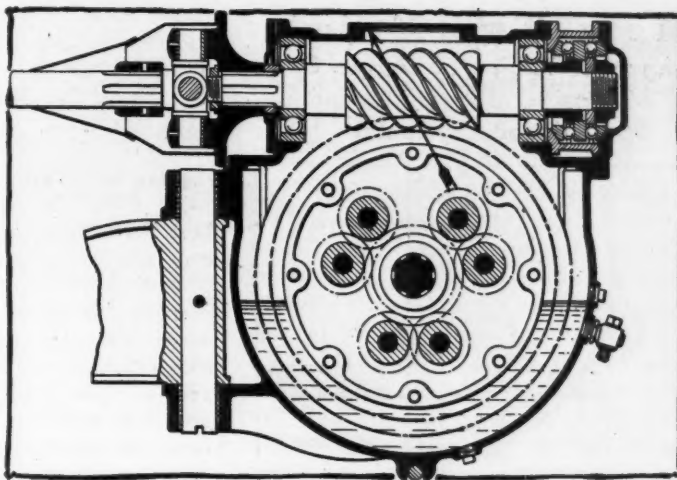


FIG. 3—PIERCE-ARROW TRUCK WORM-DRIVE MECHANISM

air. In replacing these valves, care must be taken to have them fit snugly all around their seats, with the slightest pressure possible. The supplementary springs G form gradual stops of progressive strengths to the reed valves. When the needle valve B is once adjusted and locked by means of the nut H it is not likely to require any further attention. The wire gauze screen I around the auxiliary air inlet valves should be removed occasionally and cleaned out. There also is a wire gauze screen on the front of the air pipe near the exhaust pipe; this also should be kept clean.

There is a glass window J provided in the float chamber to show at a glance the height of the gasoline therein. This should be level under ordinary conditions with the notch on the vertical spindle K. Occasionally one should remove the cap P from the bottom of the float chamber, as all dirt and water in the gasoline collect there. All connections between the carburetor and the motor should be perfectly tight. There is a hot-water jacket around the mixing chamber and the pipe leading to this jacket has a cock in it which may be closed in hot weather, but should be full open in cold weather. The spindle L of the throttle valve should be oiled occasionally to prevent wear at this point, for should the bearing become warm sufficient air might be admitted to prevent the motor from running regularly at slow speeds. In hot weather the air regulator M should be open fully, to admit cool air around the spray nozzle. In cold weather it should be kept closed. The gauze screen on this should be kept clean. The needle valve adjustment B in the spraying nozzle is practically the only adjustment on the carburetor and to operate this one has but to start the motor, loosen the lock nut H, then turn the adjusting screw B slightly in one direction or another, looking at the point at which the motor runs best.

The adjustment of the Schebler model carburetor L, used on the Marion 30 of 1911, was described in the April 4 issue of Motor Age, on page 37.

Pertinent Suggestions of Readers

Subscribers Air Ideas on Questions of Moment to Inquirers—Cause of Motor Sticking Ascribed to Rust—Duryea Gives Figures on Two-Cycle Power and Efficiency

LAKE VIEW, Ia.—Editor Motor Age—In Motor Age, issue May 16, page 31, Ralph Bennett, Pitcher, N. Y., asks relative to motor troubles. In answer thereto Motor Age suggests, among other things, that the cause may possibly be due to stuck main bearings, due to insufficient lubrication. For the benefit of the inquirer I wish to say he will find that one or more pistons will stick because of a slight accumulation of rust between the piston and cylinder wall. I have had a similar experience and found it was from such a cause. Take off the crankcase bottom, and if the pistons have not stopped on dead center, a sharp blow on the connecting rods—a cushioning blow with wood—will do the business.—Interested.

TWO-CYCLE VS. FOUR-CYCLE

Saginaw, Mich.—Editor Motor Age—In the issue of May 2 Motor Age very properly charges the faulty design and construction of early models of the two-cycle engine with the prejudice against them. But immediately following there seems to be an error when it is stated they will not give greatly more power than a four-cycle of the same size. My experience indicated that of two cylinders of the same size and workmanship the two-cycle one will develop about 1.7 as much power as the four-cycle one and that the fuel consumption under average working conditions will be proportionate to the power. In the matter of fuel consumption the two-cycle can be both more and less economic than the four-cycle. When working hard and taking full charges, it doubtless wastes some fuel, but usually it works under part throttle and does not use full charges and so does not crowd out the new gases through the exhaust, but on the contrary, having constant compression pressures, it gets more power out of what

fuel it does use than does the four-cycle, which works with lower compression under part throttle.

For cooling, the two-cycle does not need as much water as the four-cycle for the reason that the hot gases are not held against the walls so long. Usually the port opens more quickly and slightly earlier than in the four-cycle and lets out the heat at once, followed immediately by the admission of cold gases. These cold gases take from the inside of the walls the heat that would otherwise pass through and need to be taken from the outside of the walls.—Charles Duryea.

WATER IN CRANKCASE

Saint Ansgar, Ia.—Editor Motor Age—In Motor Age of May 16 Ralph Bennett asks for a method of loosening his Flanders motor. Even if possible to start it after having stuck, I would advise dismantling it, and cleaning bearings, cylinders and pistons.

This spring I found a Mitchell K, 35 horsepower, in a similar condition after standing all winter in a barn. After giving up starting it, we took it to the shop and injected acetone and later filled the carburetion chambers with kerosene, but to no purpose. As No. 3 spark plug showed rust spots on the electrode, I looked for and found that piston rusted. The crankcase lower half was full of water with a thick film of oil on top. All pistons were driven from the cylinders with a wood block, as they could not be pulled by hand. The bearings were black and gummy, but not rusty. Had we been able to start it, the bearings surely would have been ruined, and possibly the cylinders and pistons. How the water entered the crankcase I don't know, but it flowed over the top of the base when that was loosened.—Guy B. Carroll.

Metz Twin-Cylinder Improper Timing of Engine Cause of Missing—Proper Cylinder Oil for Air-Cooler

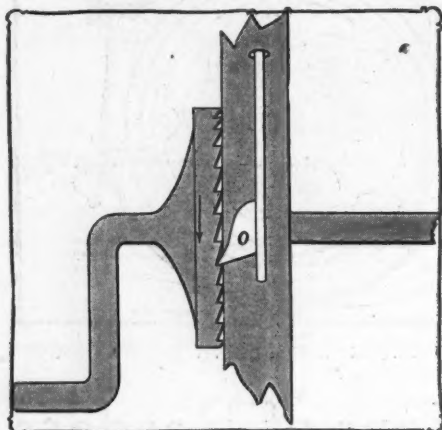


FIG. 5—MUNDEN'S SAFETY CRANK

BEAVERDAM, Ohio—Editor Motor Age—1—I have a Metz two-cylinder run-about, air-cooled, using a Bosch high-tension fixed ignition magneto. One cylinder does most of the misfiring, although the other skips at times. If I start the motor, set the throttle and let it run awhile it will run fairly well but will skip now and then. If I give it one or two notches more at the throttle it will misfire badly, and some times stop, at other times it will nearly stop but will finally pick up and run at an increased rate of speed. It will do the same thing on the road as when not pulling. What does Motor Age think is the cause? And why is one cylinder worse than the other? The compression is the same, the plugs are good, and the wiring is good.

2—The motor becomes extremely hot and carbonizing very quickly loses power. I use what is said to be good oil. What makes it become so hot?

3—I notice in turning my engine over that the intake valve on each cylinder opens about 1/16-inch before the exhaust valve seats. Is this right, or should the exhaust valve be thoroughly seated before the intake starts to open?

4—I use a Metz carbureter. In cold weather I cannot start very easily on the same adjustment that the motor runs on. I open the needle valve more to start. Why is this?—Ralph Scoles.

1—While it seems most probable that your trouble is due to improper timing of the valves or ignition, or both; it also is possible that the use of too light an oil, or faulty adjustment of the carbureter might be the chief cause of your difficulties.

2—In nearly all air-cooled motors heavy-grade cylinder oil is used. In all Metz air-cooled motors the Metz company uses Claffins cylinder oil and claims that very satisfactory results are obtained.

3—The intake valve it is claimed should not open before the exhaust valve seats,

which shows that your motor is not timed properly in this respect. The following directions for timing the Metz two-cylinder engine and magneto may help you: First turn the flywheel so that the pistons are 1/32-inch over center. With all timing gears in mesh, set No. 1 cam at the point where there is a slight action on both valve plungers; at the same time be sure that the action on both plungers is the same; in other words, set the cam so that the valves will balance with the cams. In this position there should be space enough between both plungers and valves, when same are seated, to allow the free admission of a thin piece of paper between plunger and valve. Next give the crankshaft a complete revolution and repeat this on the other cams.

To time the magneto, set the crankshaft so that the pistons are 1/16-inch ahead of full compression stroke, with the plungers of cam opposite magneto at a point of balancing. Take the cap off the distributor at the end of the magneto, turn the magneto shaft towards the left until the fiber on breaker arms touches the lower block or cam, and causes contact points to start to separate, then put on the magneto gear.

4—In cold weather it is necessary, especially with an air-cooled motor, to prime the carbureter before the engine will start, but after it is run for a few minutes the mixture should be cut down as close as possible in order to get the best results, for too rich a mixture will not only tend to overheat the motor but it also will prevent it from developing the maximum power. The cause of the motor misfiring and not running regularly, may be due to improper adjustment of the carbureter; the needle valve may not seat properly which would prevent its feeding regularly, so that regrinding might be required, or a new needle valve fitted.

There should not be over 1/64-inch space between the points of the spark plugs; and these points should be kept clean and free from oil at all times.

ETHER IN GASOLINE

Fairfax, Minn.—Editor Motor Age—Will mixing ether in gasoline give a motor more power? Is it safe to use it in this way? What are the objections?

2—Can it be used to advantage for priming a motor in cold weather?—A. L.

Mixing ether alone with the gasoline will not increase the power very much, but it will make the motor easier to start. For this purpose it is better to inject ether into the priming cups or manifold when starting. Its use is found particularly advantageous in cold weather when starting is hard. When mixed with picric acid and the mixture of the two is mixed with gasoline there is an appreciable increase in power, but as explained in answer to G. E. G., Carnegie, Pa., in the issue of May 2, the use of picric acid is dangerous in that the increased pressure of explosion may become too great for the strength of cylinders and connecting rods.

Dimensions of Valves Current Practice in Valve Diameters and Lifts Varies Among Designers

CHICAGO, Editor Motor Age—According to Motor Age, the Marmon cylinders, 4½ inches by 5 inches, use valves 2½ inches in diameter, while the Lozier cylinders, 4¾ inches by 5½ inches, use valves 2 inches in diameter. Both are successful racing machines. Why is there such a difference?

2—Are valves 3 inches or larger in diameter a success?

3—What is the lift of the valves in the above named cars; also the largest diameter and lift of valves in the following cars: Packard Six, Winton, National 40, Simplex 50, Alco Six, Pierce 48, Austin 77, Locomobile 48, White Six, Peerless 60, and Oldsmobile Six?—R. E. H.

1—Difference in valve sizes in the different motors mentioned is due to their respective differences in design and construction. When all designers think alike, more uniformity of valves may be seen.

There are many factors to be considered in arriving at the best size of valves to employ. The object is to get the gases in and out of the cylinders as quickly and easily as possible, the larger and clearer the opening, therefore, the better. But larger poppet valves require larger valve chambers. They must be heavier, are more apt to warp unless very much heavier, consequently, heavier, stiffer springs are necessary to make them follow the pushrods and cams at high speeds; heavier operating mechanisms are needed throughout; and more power is required to operate them. If the valves are contained in offset chambers as in L or T-type motors, the engine will be heavier throughout. Larger valve chambers will extend farther out sideways, the cam-shaft also must be farther out, consequently, unless some makeshift is provided such as L-shaped lifters, etc., the crankcase must be wider, and the gears operating the camshaft must be larger. The designer, therefore, endeavors to balance the advantages against the disadvantages of a construction or design.

2—Yes, all National roadsters now are using 3-inch valves; and the racing events in which these cars have participated during the past 2 years have demonstrated the success of their use.

3—The following table will give you an idea of current practice in valve diameters and lifts:

	Diameter.	Lift.
Packard six.....	2½	¾
Lozier, 4¾ by 5½.....	2½	¾
Marmon, 4½ by 5.....	2½	¾ to 1
Winton.....	2½	¾
National 40.....	2½	¾
National, Roadster.....	3	¾
Simplex 50.....	2½	¾
Alco six.....	2½	¾
Locomobile 48.....	2½	¾
White six.....	1½	¾
Peerless 60.....	2½	¾
Oldsmobile six.....	2½	¾

Spark Gap Distance Small Opening Between Plug Terminals Liable to Become Shorted Through Fouling

GREENFIELD, Tenn.—Editor Motor Age—Most magneto manufacturers advise a spark plug gap of from 1/50 to 1/64-inch with their magnetos as productive of best results. I have experimented with several cars equipped with different makes of magnetos and have been unable to get satisfactory results with plug gaps of less than 1/32-inch. Motors can be started easily on magneto with plug gaps of 1/64-inch, but in every instance that has come under my observation the motor will misfire, especially at low speeds, if the gaps are as short as 1/64-inch. Will Motor Age please explain why the motor will misfire with a plug gap of 1/64-inch when by simply increasing gap to 1/32-inch, making no other changes whatever, the motor will fire perfectly at car speeds as low as 4 or 5 miles per hour? I notice from time to time that other readers of Motor Age have had experiences similar to the above, and cannot understand why magneto manufacturers recommend such short plug gaps.—Harry C. Ward.

Your experience is unusual; at extremely low speeds most magnetos fail to generate enough current to overcome the resistance of a 1/32-inch spark gap at the plugs, and misfiring results because no spark takes place. By reducing the spark gap, the resistance is reduced, making it easier for the current to complete its circuit at the spark gap of the plugs and produce a spark. A smaller gap is more apt to be short-circuited by oil, water, or carbon; and gives a poorer spark than the larger gap; but the smaller gap is advised in the belief that a poor spark is better than none. A 1/32-inch gap is always advisable if the current will jump it at low speeds; but when a motor running on the magneto begins to run unsteadily, or buck so to speak, when the speed of the car is reduced to about 6 or 7 miles an hour, then it is evident that misfiring is taking place and it is time to switch over to the batteries to prevent stalling or stopping. When this occurs, permanent relief often is obtained by reducing the size of the gaps.

LOCATION OF SLEEVE VALVES

West Lafayette, Ind.—Editor Motor Age—List entries in 500-mile race May 30, 1912, to date, in their numerical order of starting. Also number and size of cylinders of each and their respective drivers.

2—Is there any advantage in constructing sleeve valves on the outside of the water jackets, over the inner-sleeve type?

3—What is the second speed gear ratio of the 1911 F-A-L car—speed type?

4—What is the maximum revolutions per minute of the average 4 1/8 by 5 1/4 inch Excelsior motor.—A Subscriber.

1—This list appeared in Motor Age for

May 9, page 15, with sizes of motors.

2—The advantages are less warping from the heat and better lubrication. The outer sleeve design offers some difficulties of construction that the inner sleeve does not present. The chief of these is that the motor is less compact than otherwise and in the case of a multicylinder motor the overall length is increased.

3—The stock speed Falcar has a gear ratio of 2.5 to 1 on the high gear and 5.2 to 1 on the second speed.

4—The maximum speed of the average 4 1/8 by 5 1/4 inch Excelsior motor is 2,200 revolutions per minute.

SAFETY STARTING CRANK

Bradenville, Pa.—Editor Motor Age—There are various and numerous engine starters, but from the standpoint of the owner, driver and garage man they are not regarded as a howling success in cost of installation, maintenance and efficiency, and the old starting crank is still on the job, but it sometimes inflicts injury. Why not have a safety crank. The shank of the starting crank, Fig. 5, is enlarged to allow for another set of ratchet teeth set to work backward, and on the crankshaft journal box are two pawls, one on top and one on the bottom, held in position for contact by springs. When the starting crank is pushed up to engage with the ratchet teeth on the crankshaft the pawls come in touch with the outer ratchet teeth but slide off as the engine is cranked. But, suppose it backfires. These pawls immediately catch in the ratchet teeth and as they move backward push the starting crank away, out of engagement with the engine crankshaft. I guess it would hardly pay to patent this, as getting out and going around in the mud to crank the engine is not popular, and something more suitable is going to replace it.—Joseph Munden.

Short-Circuited Batteries White Frosted Secretion on Casing of Dry Cells Is a Sure Sign of Danger to Them

BLUE SPRINGS, Neb.—Editor Motor Age—Is there any possible way by which, if dry batteries are shortened in a car where there is no possible chance of moisture getting to them, that they should get wet on the outside and soak up the paper cover, the wax having loosened from the zinc? A car here had new batteries put into it January 18, 1912. The car has not been driven since on account of extreme bad roads and cold weather. It is kept in a frame garage with cement floor. The building is new and there is no chance of any moisture getting to the car. The switch button was on the off position. No shorting can be or has been found in the wiring or in the switch. There is a difference of opinion on the matter here, and would like to have Motor Age's opinion as to the cause of the difficulty.—A Reader.

The moisture to which you refer is in all probability due to chemical action between the active compound in the cell and the zinc case, and you will find, if you scrape off the white frosted sediment that is to be found under the pasteboard cover, that the zinc casing is eaten through. This action is due to a short-circuit somewhere in the battery line. One of the most frequent causes of the trouble is that the batteries themselves are not separated sufficiently and the terminals accidentally come in contact so a circuit is formed through one or more of them. When cells begin to show this action they are worthless and had better be discarded. Go over the wiring and switch thoroughly for a short circuit.



FIG. 6—OLD BUICK 1909 MODEL 17 IN NEW DRESS

This illustrates what may be accomplished toward modernizing an old car so far as its appearance is concerned. As for its internal mechanism, the owner states that the car will do anything those of later vintage will accomplish. The car's young owner, Blanchard C. Chamberlain, of Bellefontaine, Ohio, fitted the fore-doors, new dash and upholstery, and did all the remodeling himself except some of the painting and he has a car that compares favorably with 1912 models.

American Tires Now Factors in Europe

Goodrich Company Secures Strong Foothold by Establishing Factory in Suburbs of Paris—
Incorporated Under French Laws, It is in Position To Meet Competition—Diamond
Also Bidder for Patronage—Condition of Continental Business

By W. F. Bradley

PARIS, May 10—With the opening of the B. F. Goodrich Co.'s tire factory at Colombes, in the suburbs of Paris, and the entry of the Diamond Rubber Co. into the foreign field, a new phase has been entered upon in the international history of motor car and kindred industries. The first attempt of the Goodrich company—and incidentally of any American tire company—to secure a share of European trade had its beginning in England, where the absence of a tariff made it possible to compete on even terms with the home manufacturers. The introduction to the French market took the shape of a service depot for the convenience of tourists who experienced a preference for American goods and a necessity for inch sizes. Millimeter sizes were introduced, and this American tire was gradually securing for itself a strong position on the French market, when the government raised the tariff from 90 to 150 francs per 100 kilos, practically \$18 to \$30 per 220 pounds. As Arthur E. Lumsden, the general manager of the European business, expressed it: "We either had to manufacture in France or get out." The business was too important to be abandoned, and a French factory was decided on.

A modern factory vacated by a bankrupt gasoline-electric concern proved an ideal place from which to build up a tire plant. France does not possess the counterpart of Akron. Michelin's selection of Clermont-Ferrand was accidental, the firm having been established there in connection with other business long before pneumatic tires came into being. Although it is the most important tire town in France, its position is more disadvantageous than otherwise, for against the advantage of cheap labor has to be set the fact that its position is only geographically and not industrially central. The motor center of France is Paris, and it is on the industrial belt around the capital that tire factories ought to be established. The Dunlop company realized this when it established its factory at Argenteuil on the north-western suburbs of the city. The Goodrich company followed its example in selecting the same district with a location slightly nearer Paris.

Plant a Modern One

Compared with the American standards, the French factory is small. The fact cannot be denied that Michelin holds the bulk of the European trade, and although it is impossible to designate the exact amount of business done by the respective firms, some experts place the Goodrich company

second in importance while others give it third place closely after the second. The factory ground has a total area of about 324,000 square feet of which from 216,000 to 252,000 square feet are already occupied by buildings. From this it is evident that expansion has been provided for, and indeed the prospects of the company point to an immediate increase in business.

Technical experts were sent over from Akron to start the factory, and although technical manager and practically the entire technical staff are now French, the manufacturing methods at Colombes are identical with those at Akron. The factory is a one-story building—or series of one-story buildings—with the exception of the offices. They are laid out with a view to the best labor conditions, and the various shops are remarkable for their size, airiness, and natural and artificial lighting. Power is obtained from two steam engines fed by five boilers, and every machine has its own electric motor. There is consequently an entire absence of belting.

Incorporated in France

The B. F. Goodrich Co. is incorporated under the French laws, and in this it has acted in common with most of the motor car and kindred foreign manufacturing and trading bodies having secured a strong position on the French market. At the present time the factory in the suburbs of Paris supplies the French market and various parts of Europe; it is intended

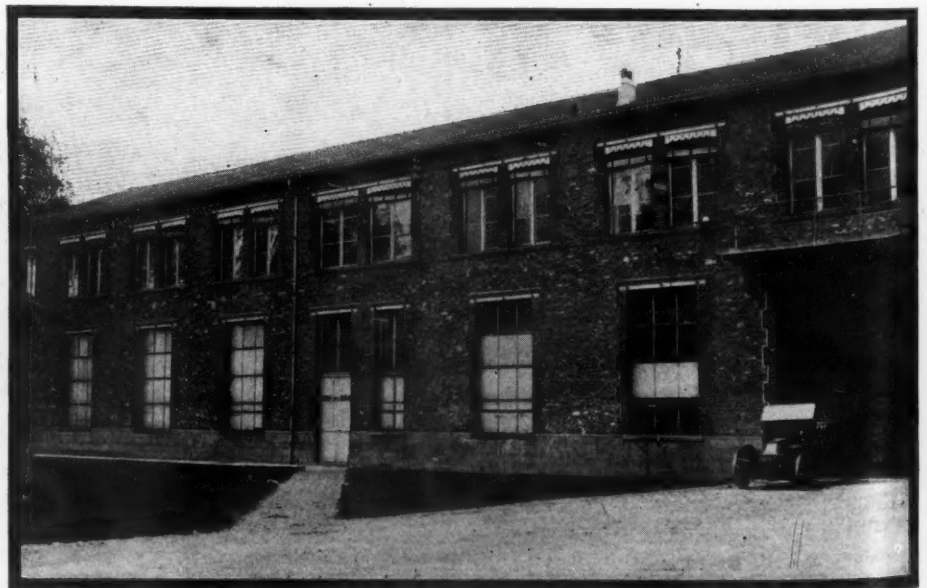
however, at an early date to handle the whole of the European business from Paris. Owing to better freight facilities it is quite possible that some of the South American markets will be fed from Europe, and South Africa is a field which can be handled more effectively from Europe than from America.

The business of the Goodrich company appears to be equally spread among the private owners and the car manufacturers. The latter business is naturally more difficult to secure, but the firm has been sufficiently long on the European market for the value of its product to become known to car manufacturers.

Basis of Tire Sales

The European method of contracting for tire equipment is rather more elastic than that in force in America. The French manufacturer lists his car with a certain make of tires, but in most cases he will give an option on any other make providing the price is no higher than that of the make he specializes on. A few years ago the writer had experiences with firms which refused to supply cars with Goodrich tires, offering either tires of French construction or none at all. This, however, was one of the difficulties attending all newcomers, and now has entirely disappeared. The public is not hampered by any question of contract, but is concerned only with mileage; taxicab companies and general hiring companies also are directly concerned with results and therefore are willing to test new tires and give them their support if satisfactory.

Practically all tires in France are now



OFFICES OF THE GOODRICH FRENCH FACTORY

sold outright. There appears to be only one company which is at all favorable to payment on a mileage basis. Michelin always has been opposed to mileage payment; Goodrich has adopted the same policy, and several others having attempted the maintenance plan have been obliged to abandon it.

According to the general manager of the French Goodrich Co., the opening of a European factory gives no advantage under the patent laws of that country for the simple reason that there are no patents in tire construction which are of any value. There are trade secrets and factory methods which always are closely guarded by those possessing them, but nothing of real value capable of being protected by law.

Giving Europe Competition

Up to the present the French tire manufacturer has not been seriously troubled with foreign competition. With Michelin at the head and Dunlop considered as a French concern—for this firm manufactures in France and is entirely independent of the English concern—the only foreigner of importance was Continental, which maintained a small factory near Paris, but imported largely from Germany. Italian firms have hardly figured on the French market, and the amount of business done by the two or three English concerns represented in Paris is very slight.

Until quite recently Goodrich was the only American representative, but during the past few months the Diamond Rubber Co. has stepped into the field and is laying plans for securing a share of European trade. According to its European manager, Keith L. Goode, the French tariff and freight add 15 per cent to the list price of tires. As the American prices already run higher than those in France, the addition of 15 per cent makes it practically impossible to compete on a price basis with the European goods. The policy of the Diamond company, therefore, has been to chop off the 15 per cent represented by freight and duty, and place the tires on sale in France at the same price as in America, trusting to their quality and the resulting greater mileage to give them the advantage over the cheaper French article.

In view of the protection enjoyed by French tire manufacturers, it is somewhat surprising to find that the official returns give very high figures for tire imports. According to the government returns, the value of motor car tires, tubes and solid tires for both horse drawn and motor vehicles, totalled \$8,025,600 for the year 1911, compared with \$5,225,800 for the preceding year. In 1911 the French tire exports valued \$10,794,600, compared with only \$4,809,000 during the year 1910.

Unfortunately the returns give no indication of the countries with which business is transacted. The imports appear to be received principally from Germany and America.



ENTRANCE TO GOODRICH COMPANY'S FRENCH FACTORY

Manufacturers' Communications

ON SOLID TIRE GUARANTEES

NEW YORK—Editor Motor Age—In Motor Age of May 9 the writer notices an article under the heading, "Tire Guarantees Vary in Big Cities." I have read the author's observations with the deep interest such an exposition of the solid tire question commands. However, I beg leave to take exception to the statement that "makers are giving greater mileage guarantees on motor truck tires in some cities than in others."

Speaking for the United States Tire Co. I can say that since our new standard motor truck tire, demountable, was placed on the market about 6 months ago we have sold it under a flat guarantee, irrespective of the city in which it was to be run. Furthermore, the guarantee we offer on this tire is 10,000 miles, our only stipulation being that the guaranteed mileage shall be used in one year's time.

Commenting on the question of a 10,000-mile guarantee, which is held by your correspondent to be a promise of the future, instead of a condition existing at the present time, proved by our own individual case, the article in question has the following to say:

"There is no reason why this mileage cannot be reached if makers will fit the trucks with tires of the right size and users will absolutely prevent overloading and abuse of equipments."

Observations which the solid tire department of the United States Tire Co. is making, continually prove the correctness of the above statement. In fact, in cities where topographical conditions are at all favorable and when trucks are operated with care and due regard for the

preservation of tires, there is no reason why an owner should not get more than his guaranteed 10,000 miles of service out of a tire.

The reason why mileage guarantees have increased from 6,000 to 10,000 miles within a few years' time is to be found in the improvement which it has been possible to make in the tires themselves. The natural evolution of the industry has brought about numerous changes in methods of construction, all of which have had a tendency to prolong tire life. Early difficulties, chief of which was the problem of preventing disintegration of the tire before it had actually been worn out, have been largely overcome in present day construction.

Considering the question of a manufacturers' guarantee in its broadest light, it really has no definite determining value upon the ultimate cost of tire maintenance beyond establishing a maximum cost. The minimum maintenance cost rests with the operator. Simply because a manufacturer guarantees his tires for 10,000 miles, there is no reason why they should not yield a greater service, the length of the service depending very largely upon the load, the speed at which the truck is driven and the character of highways or pavements that must be traveled by the trucks.

There can be no question about good pavements having a great deal to do with prolonging tire life. In cities where paving is neglected truck operators must exercise more care and discretion in driving and loading than where smooth road surfaces are presented. However, in both cases the element of conservatism in operation is the determining factor in computing tire cost. This is a condition into which the manufacturers' guarantee cannot enter.—United States Tire Co., F. F. Phillips, manager solid motor tire department.

The Realm of the

Motor Truck Service Often Misjudged

IF a motor wagon covers twice the distance in a day that is possible with a horse vehicle and with twice the load it is doing four times the actual mechanical work of the horse vehicle and at the same time gaining for the merchant using it added advantages in the increase of his business, impossible with the older systems of transportation.

Though each motor truck may do twice or thrice the work of one horse-vehicle it does not seem likely that, for retail delivery at least, there will be fewer vehicles employed by most firms—rather more.

Service Important Item

Under present business conditions prices are very nearly the same in all big stores, the difference between one and the other being largely a matter of service. As the use of motored vehicles progresses it seems reasonable to expect that eventually service will be brought to a more equal basis. Thus service of a certain class will be bought with the goods.

Many firms, on being asked concerning their motor wagon service at present in operation, make statements which show that motor service is not as yet understood, even by the users. An instance in particular was the case of a certain laundry firm using several motor wagons in its collection and delivery service. Its statement of operation was somewhat as follows when comparing its horse and motored equipments:

Motor wagon mileage per day.....	40
Load, average, per day, pounds.....	1,000
Horse mileage per day.....	20
Load, horse vehicle, average, pounds.....	500

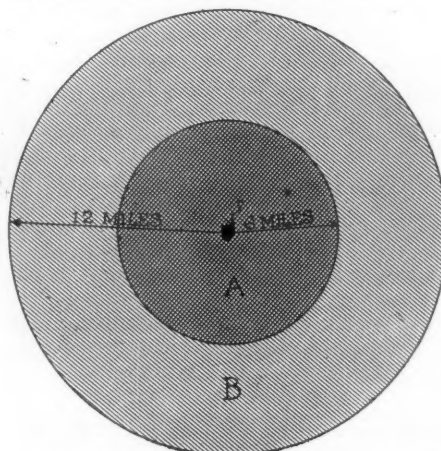
Then followed the misleading statement: "Each motor wagon is doing the work of two teams." The fallacy of this statement is soon observed on a comparison of the figures.

If the motor wagon carried twice the load for the same distance it would be doing the work of two horse rigs. If the motor-wagon carried the same load for twice the distance of the horse outfit it would do twice the work. If it carries twice the load for twice the distance it is doing not twice the work but four times the work of a horse vehicle.

The statement made by the users quoted, however, is partly true in that with this firm only two horse-vehicles have been supplanted by the new vehicle, but this in turn brings up a new aspect of the motor

Not Many Merchants Realize That When Power Vehicle Covers Four Times the Area Served by Horse Rig the Business Opportunities Are Increased Four-Fold

wagon's future which makes it probable that once motored equipments are universal, each firm of this class will have as



A—AREA COVERED BY HORSE DELIVERY.
B—AREA COVERED WITH SAME FACILITY BY MOTOR DELIVERY

many motored vehicles as it had horse vehicles originally, though each may be doing the work of three of the delivery vehicles used previously.

Explanation of Diagram

As shown in the circular diagram, the explanation of this is very simple theoretically, though the extent to which it works out practically will depend of course upon the enterprising foresight of the individual firm concerned, so that the conclusion cannot be taken as a hard and fast rule. The small circle of radius A in the sketch denotes the area which may now be covered by a grocery firm, for instance, using horse-vehicles and delivering within a radius of 6 miles, which is large for this service. The outer circle represents the area which a motored vehicle can serve with just as efficient service as regards speed, time of delivery of goods, etc.

Suppose this radius is 12 miles, which is very small for a motored vehicle. Thus the motor is covering twice the circle radius that the horse vehicle can serve and four times the area! Four times the number of customers are within the range of economical delivery, and four times the business is available if the firm is enter-

prising enough to extend its service to take it in. To handle this field, after it is developed for trade to as efficient an extent as the original territory, twice the number of vehicles would be needed as in the first place even if each were doing the work of two horsed outfits. A motor vehicle in this work should be able, however, to do the work of three to four horse wagons in ordinary service.

Motor a Good Investment

The far-seeing merchant then can well afford to take up the motor vehicle even if it might cost more per package to deliver at the start. When his territory four times as great as at the start is covered, he will need a store four times as big to handle the business. With this size plant and buying in such quantities this merchant will be able to make prices impossible to the smaller fry, meaning that as the age of the motor vehicle really arrives business and trades of this sort will tend to centralize and come under the control of large firms operating over greater areas. With this will possibly come the assimilation or elimination of the small store of the one-horse wagon, the corner grocery and market etc., unless these arrive at early conclusions and meet the new era. The old order changeth ever, new things are come to pass and he who reads the signs of the times must see the wonderful possibilities of the new motored age. Those who scoff at the motor truck now must realize the world never goes backward. These vehicles are here and eventually will be universal, and happy be he who is early to profit.

It's Service That Counts

The third point is in the matter of service. If one buy a paper of pins at the corner store and ask that it be delivered he is looked at with stony stare. If one goes to the great department store of X—he may not only have the pins delivered with courteous attention, but it is likely that the package will be at his door before he himself arrives at home.

The difference is something somewhat intangible, commonly known as service. One cannot put his finger on his books and

Commercial Car

Boston Plans To Eliminate the Horse

Hub's Fire Department Will Be Completely Motorized as Soon as Possible—Appropriation of \$50,000 Already Made and City Officials Are Planning How To Spend It

say "Here is X dollars that my extra service has brought me," but he can easily exclaim as to what it is costing the firm to give service. Yet the difference between service and lack of it is the basis of modern business. Prices vary but little, but the firm with the service gets the business though the rates be higher.

The department store mentioned above as X's is one famed the world over not so much for better goods and surely not for lower prices but for service.

A certain lumber company bids for trade successfully above lower priced competition because it can guarantee service. If a load of lumber is ordered on a certain morning it is on the job perhaps by noon of that day if it be within the limits of that city.

Example of Service


A certain steel company is now gaining enormous trade through extra service advertised, furnished and charged for of course when the steel is paid for. The service is the biggest asset of the firm and necessitates the continual stocking of enormous lots of material on expensive ground. All this space costs money for storage and the extra handling facilities necessary in connection cost large sums, including a fleet of motor trucks for yard and local city work. Yet it pays this firm to entail all this extra work expense to save the buyer delays in the reception of his goods. We pay \$5 for a meal at the St. Regis which we probably could buy at Skooglund's for 50 cents on account of the extra service which goes with it.


If firms entail such expense to gain service and still make good as a business proposition, what a business opportunity there is in the motor truck for many merchants who are puzzling now over methods for gaining sales and custom over their chief competitors!

With the extra cost of service facilities in many lines of work such as the handling of building materials, etc., there probably will come a time when in buying the goods a man will need to specify the service as well and where the man delivering with a motored vehicle can specify a maximum

unloading time for his truck and charge so much per minute over that time. For big trucks with big loads this soon will be


20 MILES 500 LBS
HORSE DELIVERY


20 MILES 1000 LBS
MOTOR DELIVERY 2 TIMES HORSE WORK


40 MILES 500 LBS
MOTOR DELIVERY 2 TIMES HORSE WORK


40 MILES 1000 LBS
MOTOR DELIVERY 4 TIMES HORSE WORK

COMPARATIVE WORK OF HORSE AND MOTOR. TRUCK CARRYING TWICE THE LOAD FOR TWICE THE DISTANCE IN SAME TIME IS DOING FOUR TIMES THE WORK OF THE HORSE RIG

necessary but will not come until trucks are in more general use in these lines.

The motor truck is the next great influence in the civilization of the world. As it comes it will work out its own problems fitly by the old law of the survival of the fittest. If one would be fit and thus live through the change and come victoriously into the new age with increased business let him study the newcomer with all diligence, consider its ways and be wise. On an understanding of motor problems depends the future of many businesses.

TALKS ON SALESMANSHIP

William Kennedy, head of the Alco transportation cost bureau, delivered an address before the Motor Truck Club of New York May 15 on "Administrative Engineering and Salesmanship in the Commercial Car Field." Mr. Kennedy said that there was a radical difference between selling pleasure cars and commercials and that the faculty of comparative analysis should be a prime essential in the truck salesman. He held that it would be unreasonable to expect the present type of pleasure car salesman to fill the bill.

AS a result of the passing of the appropriation for \$50,000 by the city council last week for fire apparatus, Fire Commissioner Cole and Mayor John F. Fitzgerald have been visiting Springfield, Mass., and New York, looking over the vehicles in use in those places, so that they may select the most available ones for use in Boston. Commissioner Cole already has decided upon the number of motor vehicles he will add to the department to supersede the horse-drawn vehicles, and these will be the forerunner of others.

The first batch will comprise three combination motor ladder trucks, three combination hose and chemical wagons and seven runabouts for district chiefs. As soon as the apparatus arrives, chemical company 5 at Egleston square, chemical company 6 at Harvard avenue, Brighton, and chemical company 11, Carlos street, Dorchester, will be disbanded and the combination ladder trucks will take their places.

The combination hose and chemicals will be installed in ladder 23, Washington street, Grove hall; hose 48, Hyde Park, and engine 37 house, Longwood avenue, Back Bay. The runabouts will be given to District Chiefs Godbold of East Boston, Ryder of Jamaica Plain, Kennedy of Roxbury, Murphy of Dorchester, Madison of Brighton, Mulligan of West Roxbury and Heffernan of Mattapan. This will make twenty pieces of motor apparatus in use by the fire department.

Bids for the new apparatus will be printed in the Boston City Record, the municipal paper issued by the city, and to which city bids are all confined.

ANOTHER BLOW AT THE HORSE

A permit has been issued by the bureau of building inspection of Philadelphia to Armstrong & Latta to convert the stables of the Adams Express Co., on Twenty-second street below Market, into a garage at a cost of \$27,000. This is the first step in the plans of the company to do away entirely with horse-drawn equipment, motor trucks to eventually be exclusively used for delivering and collecting packages. The fleet of trucks now operated is housed in the company's stables scattered around the city. It is expected by the first of the year to have nearly all the horses and wagons now in use superseded by motor trucks.

MINNESOTA Has 20,000—The registration of motor cars in Minnesota has passed the 20,000 mark and the secretary of state looks for 30,000 in 1912.

Reorganizing Spokane Club—Dan E. Crowley of Spokane is making an effort to reorganize the Spokane Motor Club, which suspended 3 years ago. The Spokane County Good Roads Association has endorsed the movement to reorganize the club.

Relocation of Mt. Tom Road—Officers and members of the Hampshire Automobile Association have taken a prominent part in the hearings before the commissioners of Hampshire county in the matter of the relocation of the highway from Mt. Tom to Northampton, Mass. Because of the present uncertainty of the grade crossing changes it is doubtful if any change is made in the highway for a time. Eventually it will be straightened and regraded.

Harrisburg Toll Reduced—In compliance with a request for the reduction of tolls made by the Motor Club of Harrisburg, Pa., the People's Bridge Co., owner of the bridge across the Susquehanna river at the Market street crossing at Harrisburg, announces a reduction of toll for motor pleasure vehicles. Hereafter for all such vehicles, whether two passengers or larger, the rate will be 5 cents for car and driver and 1 cent for each additional passenger.

After Waubonsie Trail—Citizens along the South Dakota scenic highway between Sioux Falls and Rapid City, S. D., have organized to work for the extension of the famous Waubonsie trail between Shenandoah, Iowa, and Omaha, to make a continuous thoroughfare through the Bad Lands, the Black Hills, and on to the Yellowstone park. Pennington county will build a \$50,000 bridge across the Cheyenne and a special boat is being made to cross the Missouri.

Meriwether Chosen Captain—Lee Meriwether, an author, has been elected president of the 50,000-Mile Maxwell Motor Club, recently formed as a national organization to encourage touring and reward owners of Maxwell cars according to the mileage they have made. Mr. Meriwether is the first motorist to qualify for one of the gold medals which the Maxwell-Briscoe Motor Co. is presenting through the club to all owners who have traveled 50,000 miles or more.

Club Turns a Trick—As a result of the Danbury Automobile Club taking the initiative it is expected that the dangerous grade crossings on the Mill Plain road at Danbury, Conn., long the bugbears of all users of the highway, particularly the motorists, will be abolished. The motor club officials recently wrote to the railroad officials complaining about the crossings and asking that something be done to eliminate the dangers there. A prompt reply was received from the railroad to the effect that the matter would receive atten-

tion and that it had been turned over to the railroad's chief engineer for investigation and report.

Illinois Dealers Interested—Dealers in Joliet, Ill., have decided to co-operate with other Illinois cities in a campaign for improving the roads. Elgin and Kankakee are the first cities to join. It is proposed to foster the upkeep of the present roads until the time comes when permanent highways can be constructed.

All Funds for Road Work—The Automobile Club of Winona, Minn., has decided to use its funds to keep in repair one-third of the county roads in 1912. This calls for \$6,000 a year and periodic dragging of 400 miles of road. The county board has agreed to pay one-half, and town boards will pay the remainder of the balance.

Another Good Roads Worker—Dixie, Wash., has joined hands with other towns in the neighborhood of which Walla Walla is center, by organizing a commercial club with better roads the main object. Officers elected were: D. W. Lamb, president, and H. D. Eldridge, secretary. Probably the first road to be considered will extend from Pendleton, Ore., Pomeroy, Wash., by way of Athena, Weston, Milton, Ore., Walla Walla, Dixie, Waitsburg and Dayton, Wash.

Farmers in Motor School—Forty farmers have begun the annual school of theory and practice of traction engines at the Minnesota state agricultural college. The course is under direction of Instructor J. L. Mowry of the chair of engineering and will last 4 weeks. Mornings are spent in the class room, where the afternoon work in the shops and field is outlined. In the afternoon the students practice making pipe fittings, valve settings, farm blacksmithing, and experiment with electricity, fuels and oils and try their hands at actual running gasoline, also steam engines. The graduates are given second class engineer licenses. With experience an applicant may get a chief engineer's license.

Arcadia Run Booked—After deciding to postpone the dedication trip of the Arcadia-St. Louis highway, last week, the officials in charge of the run have changed their minds and at least twenty cars will make the tour Thursday, Friday and Saturday, May 23, 24 and 25. The tour is a beautiful one and is an ideal 1-day run for St. Louisans. It starts at St. Louis, goes through De Soto, Bonne Terre, Doe Run, Flat River, Iron Mountain, Ironton and Farmington, Mo., and its terminus is the Arcadia Country Club, where many wealthy St. Louisans have homes. Services will be held in all towns along the route for the dedication and a big reception will be held both in Farmington,

where the Southeast Missouri Drummers' Association has a convention, and at the Arcadia Club.

Another Office for Hooper—At the regular monthly meeting of the directors of the Automobile Club of Philadelphia, Robert P. Hooper, president of the American Automobile Association and president of the Pennsylvania Motor Federation, was elected a director of the organization to succeed George D. Linnerd, resigned. About thirty new members were also elected at the meeting.

New Haven Club Elects—At the annual meeting of the New Haven Automobile Club of New Haven, Conn., new officers were chosen for the first time since the club was organized, as follows: Philip Bond, president; Adolph Mendell, vice-president; Fred C. Hall, treasurer; F. H. Mason, secretary. The club is going to start an active campaign to try to force the park commissioners to open East and West Rock parks, New Haven's best park drives, to motorists this year. Motor cars always have been barred from the parks.

To Signpost Desert—To lessen the dangers of the Great American desert and its annual toll of human life is the mission on which a Flanders 20 will soon begin an all-summer trip from Pasadena, Cal. The car will be driven by Lou Weston Peck, who has dedicated his life to the charting and posting of indefinite trails. He expects to post the desert trail in such a way as will direct parties to good water and away from bad. He will penetrate as far as the famous death valley this coming summer.

Abolishing Grade Crossings—An effort is to be made to abolish grade crossings in St. Louis county, Missouri, by the Automobile Club of St. Louis. The county officials have been aroused and will assist in the work. An inspection of the crossings was made by the railroad commissioner of Missouri and county officials, May 20. The recent agitation over the grade-crossing evil was started by the death in a grade-crossing accident last week of Frank J. Bergs, one of the board of governors of the Automobile Club of St. Louis.

Passing of the Coachman—A striking commentary of the rout of the horse by the motor car is instanced in Syracuse, N. Y., where the Chauffeurs, Auto Drivers and Auto Workers' Association of Onondaga county was originally the Coachmen's Association, established in 1889 as a sick, death and protective order of coachmen in private families. The order then numbered 100 coachmen in private families. Today it has 120 members and there is not a coachman in the lot. But there are forty-two former expert horsemen who are now driving motor cars for these same

From the

Four Winds

families, having learned to do so at the request of their employers. It was in November, 1910, that the name of the order was changed.

Would Buy Toll Road—Commissioners of Floyd county, Indiana, have made an offer of \$800 a mile for the 14 miles of the toll road in Floyd county owned by the New Albany and Paoli Turnpike Co. This is one of the last of the toll roads in Indiana.

Hoosiers Plan a Sociability—Members of the Hoosier Motor Club will give a sociability run to Newcastle, Ind., and return from Indianapolis on May 19. The round trip will be about 90 miles and those participating will enjoy a chicken dinner at Newcastle.

Minnesota Starts Work—The state highway commission of Minnesota has begun construction of the first stretch of rural concrete road, 1,300 feet in all, in Steele county, as an experiment. The roadway is to be for mixed traffic, 20 feet wide, with 8-foot concrete center. On each side will be a clay and gravel shoulder 6 feet wide. One dollar a lineal foot is the estimated cost.

Police Commissioner President—Police Commissioner A. G. Porter was elected president of the Niagara Falls Automobile Club of Niagara Falls, N. Y., at the annual meeting of that association. Fire Commissioner David Isaacs was chosen vice-president and R. Max Eaton was selected for the secretaryship. It was through the efforts of this association that Senator R. H. Gittins introduced into the Albany legislature the million-dollar good roads bill.

St. Louis Plans Reliability—The Automobile Club of St. Louis is discussing the giving of a 2-day reliability run late in the season instead of the annual day run in St. Louis county, which has always been held in June. It is extremely probable that it will finally be decided to make the event a 2-day affair running to Jefferson City, the state capital, along the state highway and return. If the run is held over this route it will likely be pulled off in August or September.

Club Forming at Racine—The Racine Motor Club has been organized at Racine, Wis., as a non-stock corporation and will become affiliated with the Wisconsin State A. A. and the A. A. A. This is the first time that the motorists of Racine, a center of the motor car industry in the middle west, have come together, and it is due to the efforts of the Milwaukee Automobile Club that the organization was perfected. Dr. A. E. Taylor is temporary chairman and Arthur Simonson temporary secretary of the organization, which will elect permanent officers late this week. It

is hoped to line up more than 200 members at once. It is the intention to work for a permanent improved highway between Chicago and Milwaukee, through the city of Racine.

Wheel Tax in Joliet—Hereafter motor cars must pay an annual license fee while operating upon the streets of Joliet, Ill. The minimum fee will be \$1 for cars of 20 horsepower or less, while the maximum will be \$60. Drivers must wear a badge showing that they are licensed, while the license tag for the car must be prominently displayed. Most of the owners of these trucks are in favor of a license as without the tag they are stopped by policemen of Chicago when driving the cars to the metropolis.

Climb at Shoshone Falls—A hill-climb up the canyon wall at Shoshone Falls, Idaho, is planned for July 11 by the Twin Falls County Automobile Club. The road is V-shaped and the grade ranges from 2 to 20 per cent in the mile climb. A superb view of the entire climb is afforded spectators from the knolls and the piazza of the hotel, the road being across the river just above the falls. The electric railway from Twin Falls will be completed before the date set for the climb, and a large crowd is expected. The contest will be held under A. A. A. sanction.

Want Yellowstone Opened—The president of the Idaho State Automobile Association has just been elected president of the Bannock County Automobile Club. As the head of the two organizations he will begin with renewed energy the efforts being made to have Yellowstone park opened to motor cars. The Pocatello club has been the leader in this work and already has accomplished a great deal. It has been largely instrumental in raising the fund of \$15,000 to improve the road leading to the park. In Bannock county alone \$5,000 was subscribed, which will be enough to macadamize one mile. When funds are secured from adjacent counties, other miles will be built.

Kewaunee Has a Club—The Kewaunee Automobile Association has been organized at Kewaunee, Wis. Dr. W. M. Wochos was elected president and E. Seidenglanz vice-president. Kewaunee county is at the beginning of the famous Door county peninsula in northeastern Wisconsin and enjoys an immense tourist business every summer. The club will work for good roads and streets all through the peninsula and intends to affiliate with the Wisconsin State A. A. and A. A. A. At the instance of the Milwaukee Automobile Club, which is attempting to organize motorists throughout southern Wisconsin, it is likely that a club will be formed at Watertown,

Wis., soon. A. R. Barker, prominent in state association circles and a member of the M. A. C., residing at Watertown, is at the head of the movement.

Planning to Organize—Owners of Springfield and Sangamon county, Illinois, have decided to organize and 150 have already signed the charter list. A meeting will be held early in June and officers elected. The object of the association is to promote good roads, secure favorable legislation, assist city officials in traffic regulations and fight wild cat legislation in the courts.

Changes Club Name—A meeting of the Jeffersonville Automobile Club was held at Jeffersonville, Ind., to further the interests of the organization in making a fight for good roads in Clark county. In order to enlarge the scope of the club, it was decided to change the name of the Clark County Good Roads' Association, and it is expected that a number of persons not residents of Jeffersonville will be enrolled as members. Headquarters will be opened at once at 222, 224 and 226 Spring street.

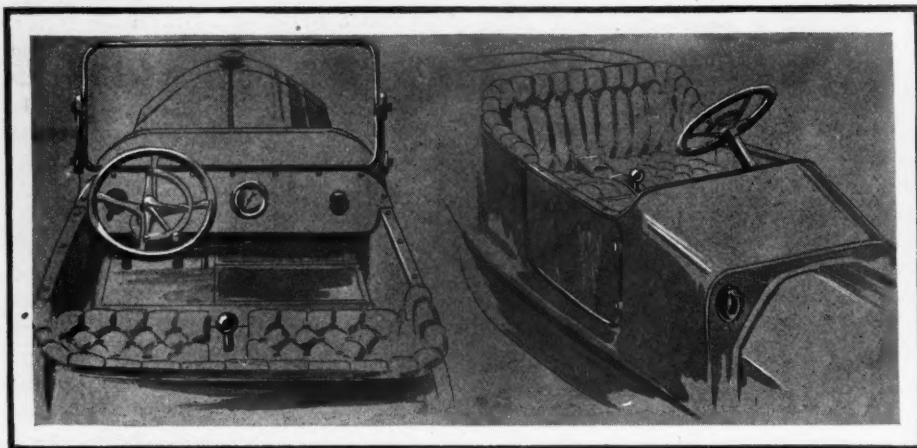
Tag Record Broken—The registrations by the state highway department of Pennsylvania May 15 broke all records for number and size of receipts, the total of 44,272 for 1911 being passed by ten when the business closed for the day. The income since January 1 from this division amounted to \$446,282.45, against \$429,523.50 from the whole of last year from registrations. Thus far 15,030 chauffeurs have been licensed, over 5,000 more than last year. There have been 3,136 dealers and 567 special drivers' licenses taken out.

Hoosiers Adopt Guide Post—L. R. Carson of the Indianapolis Architectural Club has been awarded first prize in the guide post design competition conducted by the Hoosier Motor Club of Indianapolis. Carson's design proposes a wood sign giving the direction and seal of the club surmounting a reinforced concrete post. He estimates the guide posts, which are to be placed by the club on the principal highways out of Indianapolis, will cost \$2 each. The club has postponed its sociability run from Indianapolis to Newcastle and return from Sunday, May 19, to Sunday, May 26.

Spreading Gospel by Motor—Preaching the gospel by motor car is the novelty to be given a tryout in Peoria, Ill., this summer by Illinois clergymen. The decision was reached at a meeting of the ministerial association and a committee to take the necessary action was appointed. A speaker, accompanied by a male quartet, will be whirled from street to street, stopping on the most densely crowded corners while a selection will be sung and a sermonette preached. It is argued that the motor system will create an intimate relationship between speaker and audience, reaching people who could not be gotten into a church. In addition, the very novelty of the method will prove an appeal.

Henderson Car Makes Its Debut

New Indianapolis Product Offered as Roadster and Touring Car with Four-Cylinder Block Motor—Left-Hand Drive and Gearset Lever Between the Front Seats



FORWARD COMPARTMENT OF HENDERSON SHOWING LOCATION OF GEARSHIFT LEVER AND FLUSH DASH LAMPS

INTEREST attaches to the announcement of the latest Hoosier product in motor-dom, the Henderson car, not alone from the fact that its maker, the Henderson Motor Car Co., was organized by the same men who conducted the affairs of the Henderson Motor Sales Co., the sales organization of the Cole factory, but also because the car itself has some novel features. Though the new car displays decided departures from contemporary American practice in the design of gearset control and gasoline tank location, these features have the sanction of leading European designers. The remainder of the car follows well-tried practice, combining a number of things not usually found in a car of the same price classification. The first Henderson car will be shown to the public

on May 30, the date of the 500-mile sweepstakes race at the Indianapolis motor speedway.

The newcomer appears as a single chassis model to which are fitted two bodies, a five-passenger touring car and a torpedo roadster. The former is called the model 46 and the latter as model 44.

The general specifications of this car include a four-cylinder monoblock cast Buda motor of the L-head type, suspended at three points with thermo-syphon cooling and a continuous circulating oiling system, a leather-faced cone clutch, a Stutz rear system of the same size as used on the powerful Stutz car. The gasoline tank is located under the dash cowl. An electric Ward-Leonard lighting generator is mounted on the motor crankcase and

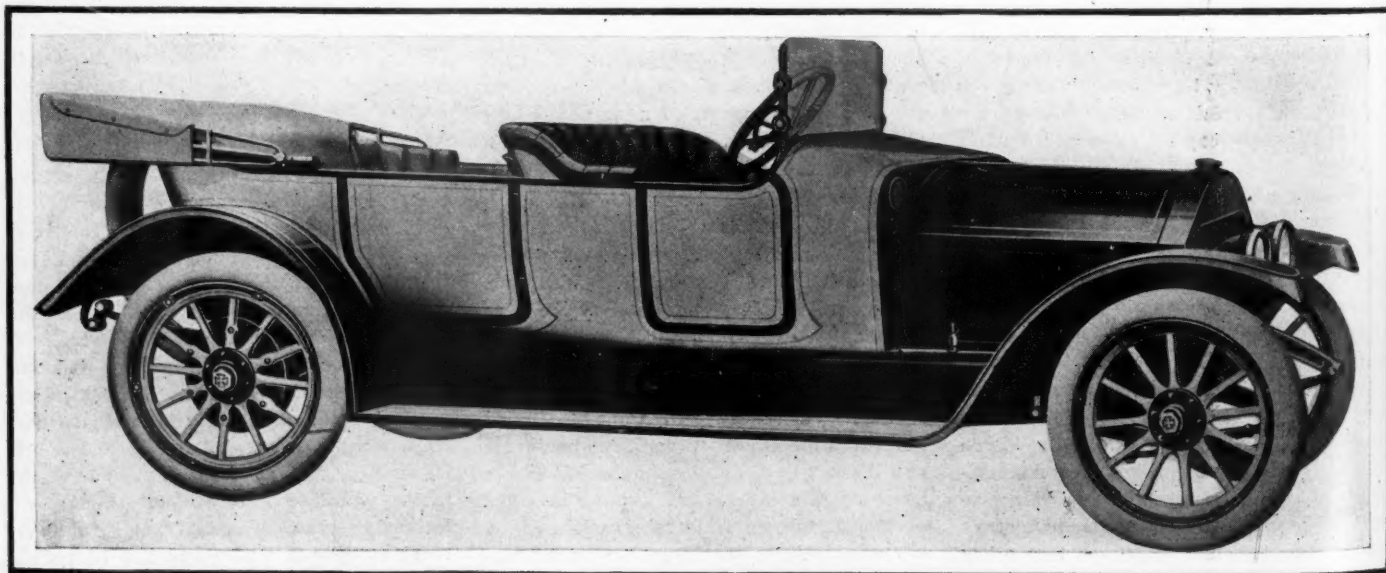
driven direct. A Disco motor-starter is a feature of the motor equipment. The wheelbase is 116 inches and 34 by 4 inch tires are supplied on demountable rims. **Henderson Power Plant**

The Henderson motor has a stroke-bore ratio of 1.27, the stroke and bore of the cylinders being $4\frac{1}{4}$ and $5\frac{1}{4}$, respectively. The valves are arranged on the right side of the motor. The mushroom tappets are provided with hardened screws and set nuts at their upper ends, for adjustment. Cast-iron guides are provided for the valve stems. The valve heads are $2\frac{1}{8}$ inches in diameter, and have a lift of about $\frac{3}{8}$ inches.

A single casting includes all four cylinders and the intake manifold. The latter is a particularly advantageous feature in connection with the use of low-grade gasoline. Ample water spaces are provided around the valves, to insure free circulation. The top of the waterjacket is covered with a casting which also forms the water outlet pipe.

The pistons are provided with four eccentric rings. Wrist pins are hollow and of large diameter, and are secured in the piston bosses by cap screws which project through them. The connecting rods and crankshaft are drop forged from alloy steel and heat treated to show a tensile strength of 120,000 pounds per square inch. The main bearings are three in number and are 2 inches in diameter. The crankcase is a well-ribbed aluminum casting having the bearings supported in the top half. The rigidity of this structure has much to do with the smooth running of the motor at high speeds.

The camshaft is a forging and has an exceptionally large bearing at the front, where the side pressure due to the driving gear is absorbed. This bearing is of phosphor bronze and has a diameter of 2 inches



HENDERSON 1913 FIVE-PASSENGER TOURING CAR

Two Body Types with Novel Control

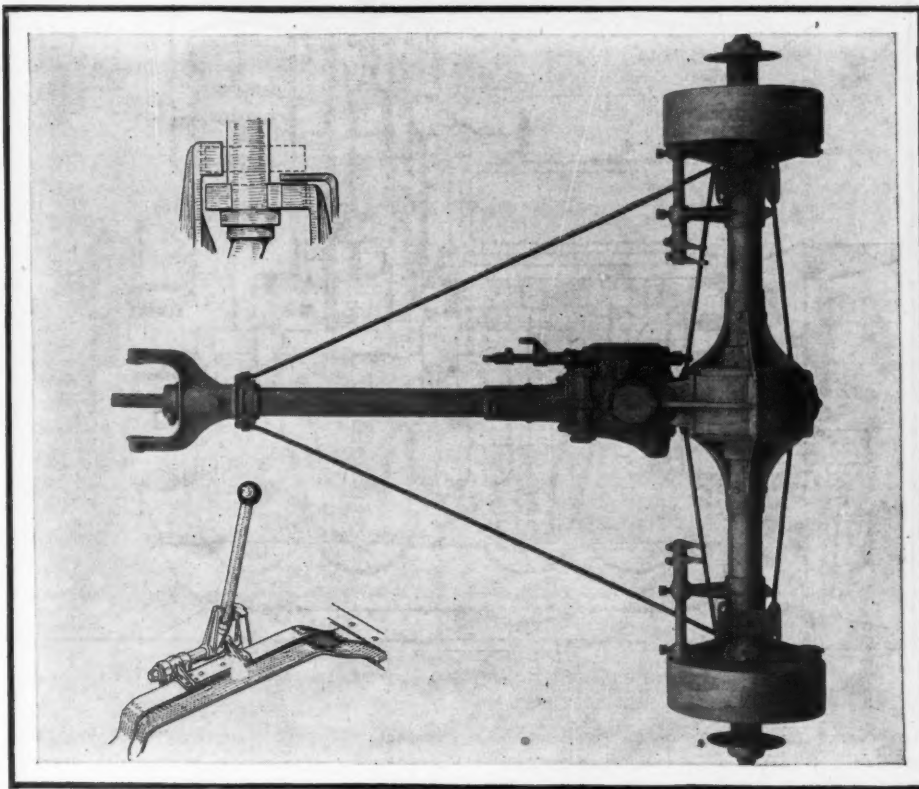
and the same length. The timing gears are cut helical, to insure quiet and smooth running at all speeds of the motor.

The lower half of the crankcase forms an oil reservoir, and is divided horizontally into two parts. The upper portion has a depression under each connecting rod, into which the bottom of the rod dips at each revolution of the crank. Holes are provided at the proper level so that the excess oil falls back into the lower part. A plunger pump, operated by an eccentric on the camshaft, takes the oil from this pump and forces it through a sight feed on the toeboard to the three main bearings. The remainder of the motor parts employ splash lubrication.

Fuel Tank on Dash

The carburetor is of Schebler make, $1\frac{1}{2}$ inches diameter. The location of the gasoline tank under the dash cowl gives a drop of 16 inches between the bottom of the gasoline tank and the float level in the carburetor, and insures a good flow of fuel under all conditions. At the same time, the carburetor is higher than usual, giving a short intake pipe. A water jacket is provided on the carburetor for the purpose of supplying heat in cold weather. This is unnecessary save in most extreme climates, however, on account of the inclusion of the manifold within the cylinder casting.

The Ward-Leonard lighting generator is mounted on a pad forming an integral part of the crankcase, and is driven from the crankshaft by gears corresponding to the camshaft gears on the other side of the motor. The generator rotates at engine speed, and is designed to carry the entire lighting load when the car is traveling at 10 miles an hour or faster. At lesser motor speeds the battery, which is situated under the front seat, is called upon to



REAR SYSTEM OF HENDERSON WITH DETAILS OF GEARSET CONTROL

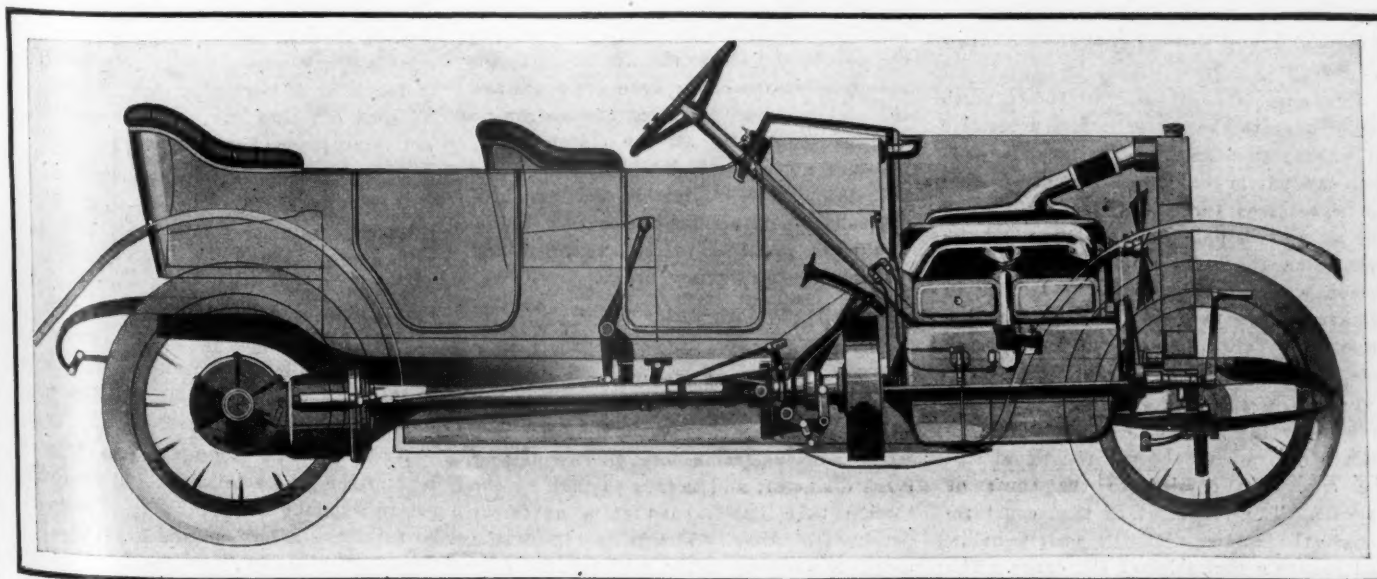
furnish the lighting current. The same battery furnishes ignition current for use in starting.

Ignition Arrangement

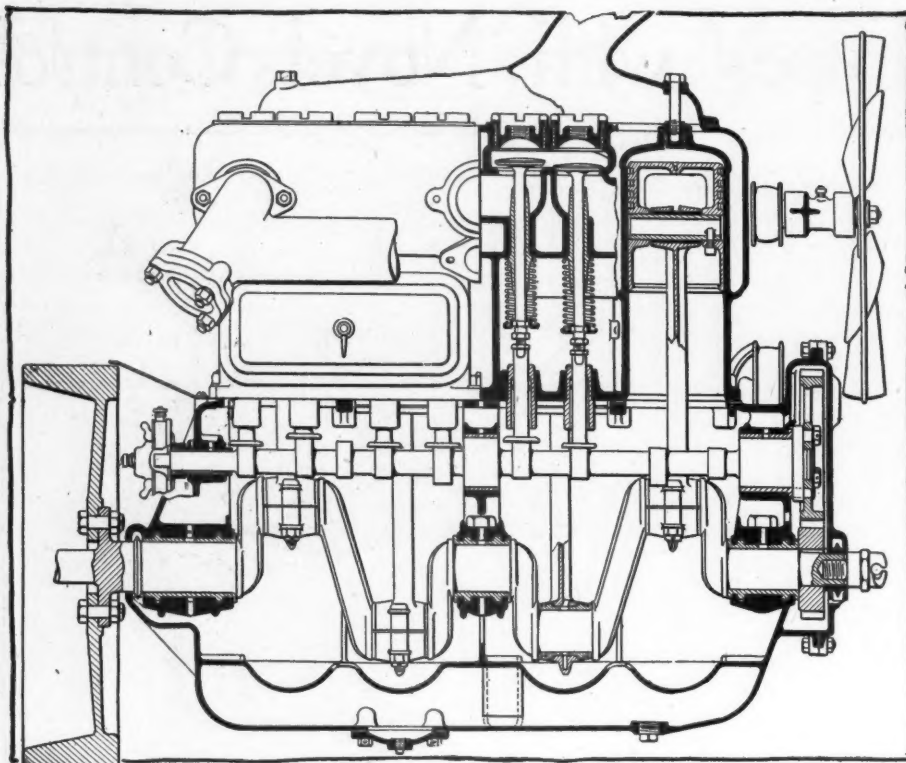
A Remy magneto is fitted, and is driven from the lighting generator shaft, the two instruments being mounted in line with each other on the left side of the motor. The switch is placed on the dashboard at the rear of the dash cowl, together with the other instruments.

The increasing tendency toward left-hand drive and center control has not been

disregarded in the design of the Henderson car and an extremely neat and simple arrangement of the gear control lever has been worked out by the designer. This lever has a hard rubber ball end which projects through a slot between the two front seat cushions and has a forward and backward movement. The equivalent of a conventional H quadrant is used, but the action of crossing through the gate of the quadrant is accomplished by a vertical movement of the lever. The operation is extremely simple and should cause no



PHANTOM VIEW OF HENDERSON TOURING CAR



PART SECTION OF MOTOR OF HENDERSON CAR

trouble, even to beginners. In fact, the convenient location of the lever, together with the short movement necessary is said to make gear-shifting very easy. In starting the car, the ball handle is pulled up about 1 inch, and moved backward approx-

imately 2 inches, meshing the low-speed gears. To obtain the intermediate speed, the lever is pushed forward, drops down through the gate of the quadrant, and by a further movement forward, causes the engagement of the intermediate gears. Simply pulling the lever back then gives the high speed. The quadrant is so arranged that in going from low to second speed there is no danger of accidentally continuing forward along the upper side of the H and engaging the reverse gears unintentionally.

The clutch is a leather-faced cone having a diameter of $15\frac{1}{4}$ inches and face of $2\frac{3}{4}$ inches, the angle of the face being $12\frac{1}{2}$ degrees. It is operated in the conventional way by the left pedal, through the medium of a ball thrust collar. The spring tension may be adjusted, if necessary, by removing the universal joint at the clutch. A toggle action is interposed between the pedal and the clutch collar, relieving the operator's foot of practically all the clutch spring pressure after the pedal has been moved 2 inches or so. A further movement of the same pedal applies the service brake. The right pedal is ratchet retained and controls the emergency brake.

Gearset Unit With Axle

The three-point suspension idea is carried out in the rear system, as well as in the motor. The yoke at the front end of the torsion tube is supported by a cross-member of the frame through two pins of large diameter, and is free to turn on the torsion tube itself, so that a universal action is obtained. The gearset is of the usual three-speed type, with shafts supported on ball bearings. The rear axle proper is a three-quarter floating construc-

tion, large roller bearings being employed to carry the shafts. The latter are of nickel-steel, and have squared ends with a conical collar just inside the squared end that receives the wheel hub. The hub has a similar tapered hole and is forced into place with a nut, this construction giving a rigid and strong fastening. The brakes are both of the internal expanding variety, placed side by side inside and are on 14-inch drums. Both brakes are operated through equalizers. Adjustment of both brakes may be made on turnbuckles situated under the front floorboards and locked by wing nuts. No tools are required for this adjustment.

The front axle is an I-section drop forging, dropped between the spring pads. The tie rod is in the rear of the axle. The springs are semi-elliptic in front, 38 inches long, and three-quarter elliptic in the rear, 50 inches by 2 inches. The frame is of channel section, 4 inches in depth. It is inswept at the front to allow a short turning radius, and has a kick-up of $5\frac{1}{4}$ inches at the rear, to allow spring action in connection with a low frame.

The Gemmer steering gear uses a worm and complete gear. The steering column shows for only a short distance down from the wheel, since it runs through the rear-board of the cowl. An 18-inch wheel is fitted.

The mudguards are wide, and are braced at the front by the lamp bracket which runs across the car at this point. The lamps are finished in black and nickel.

Show for Used Cars

Boston, Mass., May 20—A motor car show for used cars is the newest plan in Boston to get rid of cars with which the local dealers are stocked up. At least that is the scheme evolved by O. D. Corbett, who has conducted motor shows in some of the New England cities. Mr. Corbett came to Boston last week and immediately leased the Arena, the biggest show building in the city with the exception of Mechanics' building, where the annual motor shows are held. He has taken it for a week beginning June 5 and then he sent out circulars to the local dealers notifying them about his plan.

In his letter he announces that space will not be allotted to new cars, but only to the used cars or ones taken in trade. Cars sold during the day may be removed at night and others put in. Under Mr. Corbett's plan space is to be sold at the rate of \$100 for a booth sufficient to accommodate two cars without crowding. Admission is to be 25 cents and admissions supplied to exhibitors at half price.

When the show closes a rebate of 50 per cent of the paid admissions will be divided pro rata among the exhibitors. Music will be furnished afternoon and evening. It is a question if many of the local dealers who are members of the Boston Automobile Dealers' Association will go into it.

Liability of Stockholders

NEW YORK, May 20—Liability of stockholders in a bankrupt foreign corporation was construed not to extend to such stockholders as contracted for and purchased stocks at less than par upon the express agreement that the payments made should cover all charges, in the opinion of the New York court of appeals delivered by Justice Collins in the case of the trustee for the Remington Automobile and Motor Co. against Andrew D. Morgan.

The case is considered to be of much importance to the motor industry because of the frequent application of the common law axiom that a stockholder is liable to be assessed for the difference between the amount he paid for his shares and the par value thereof. In the case at bar, action was commenced by the trustee in bankruptcy to recover the difference between par value and \$25 a share, which was the sum paid by Mr. Morgan.

Judgment was rendered in favor of the trustee by the supreme court and the appellate division of the same tribunal and the case was carried to the court of appeals. The judgment of that court reverses the findings of the courts below and grants a new trial of the cause. The costs of litigation already amounts to many times the total sum involved.

The Mathematics of Motoring

ON this page is a diagram by which the average speed in miles per hour for 1 mile can be found without calculation if the time in minutes and seconds is known. In using the chart, the times in minutes and seconds for a measured mile will be found at the right of the page and the speeds in miles per hour at the bottom of the page. To find the speed of a car that goes 1 mile in a given time, find the time as marked at the right of the page and follow the horizontal line left till it intersects the curved line; then drop down on the vertical line to the bottom of the page. The miles per hour shown there will be the speed of a car making 1 mile in that time.

Example: Assume the car went 1 mile in 1 minute 30 seconds; to find its speed in miles per hour. The time, 1 minute 30 seconds, is found at the right of the chart. Follow left on horizontal line to point where horizontal line cuts the curved line. Then drop to bottom of page, reading 40 miles per hour.

It often is of interest to the motorist to know what average speed was maintained by his car over a given distance or for a certain length of time. The speedometer hand is not available for this purpose, for though it will indicate the speed at any certain time, there is no means of telling from it what average speed was maintained. Of course if the distance covered and the length of time required are known, the figuring of the average miles per hour is simply a matter of arithmetic, but the division of time into hours, minutes and seconds makes the calculations perplexing.

The easiest way to approach the problem is to reduce the hours, minutes and seconds to hours and decimals thereof. Then it is necessary only to divide the distance in miles by the time expressed in hours. To reduce hours, minutes and seconds to hours, first reduce the seconds to a fraction of a minute by dividing by 60; then reduce the minutes and fraction of a minute to hours by again dividing by 60.

Suppose the odometer, or distance-recording part of the speedometer showed

Average Miles per Hour

that 45 miles were covered and the watch showed it took 1 hour 24 minutes and 17 seconds to make the distance. The average speed can be found as follows:

17
— = .28 minutes, so the total time is 1
60
hour 24.28 minutes.
24.28
— = .405 hour, so the total time also
60
equals 1.405 hours.

Now we have the time in hours, and dividing the distance in miles by that, we have

$$45 \div 1.405 = 32 \text{ miles per hour.}$$

The formula for the speed in miles per hour when the time is expressed in hours as above, is

$$S = \frac{D}{T} \quad \text{Where } S \text{ is the speed, } D \text{ is the distance in miles and } T \text{ the time in hours.}$$

If T is expressed in minutes, the formula is

$$S = \frac{D \times 60}{T}$$

If the time is used in seconds, the formula is

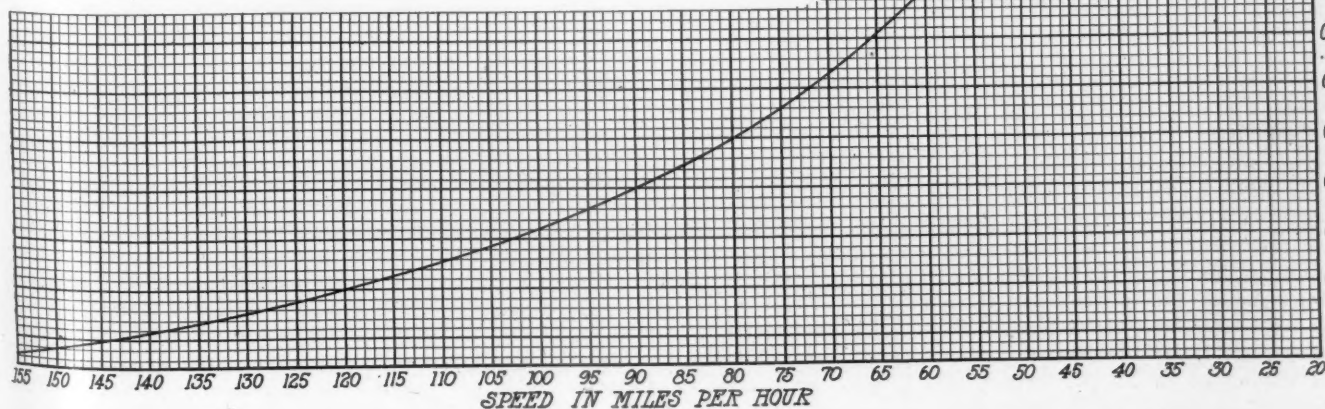
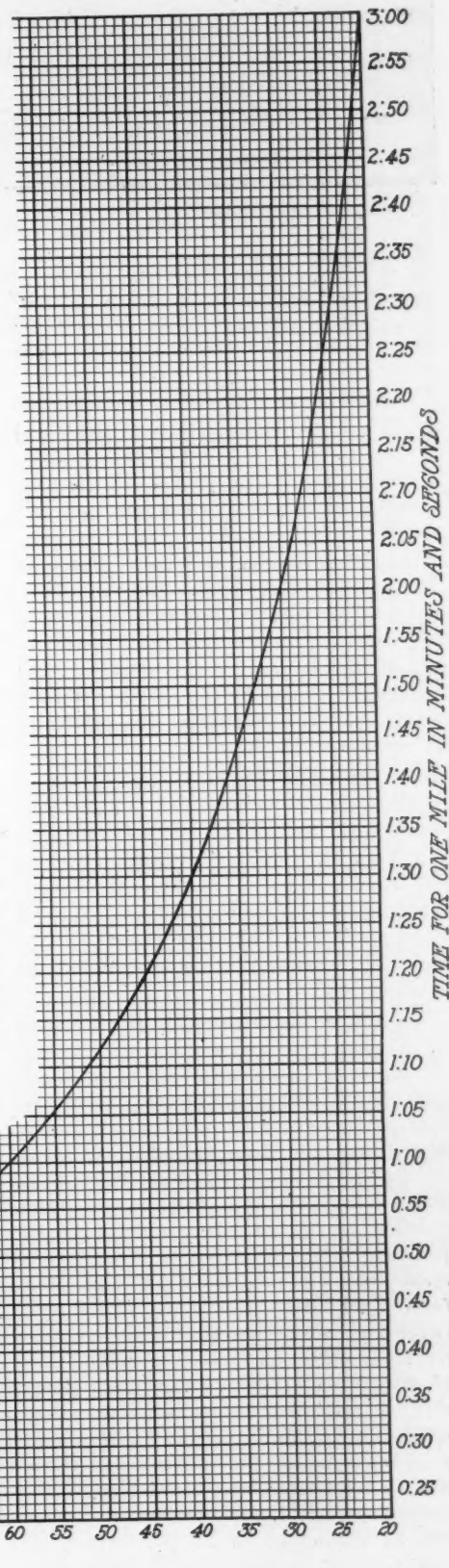
$$S = \frac{D \times 3600}{T}$$

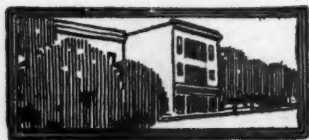
One of the most frequent of speed determinations is the average speed for a measured mile. To find the speed for 1 mile, divide 3600 by the time in seconds, or divide 60 by the time in minutes. For example, if it takes 1 minute and 30 seconds to travel the mile the average speed is found in either of two ways. 1 minute and 30 seconds if expressed in minutes, is

$$\frac{60}{1.5} = 40 \text{ miles per hour.}$$

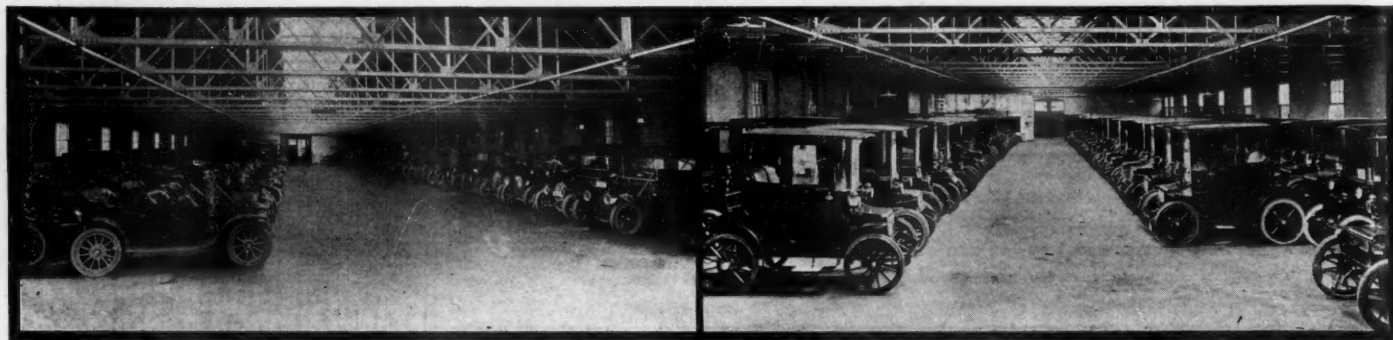
Using seconds, we have 1 minute equals 60 seconds and 1 minute and 30 seconds equals 60 plus 30 or 90 seconds;

$$3600 \div 90 = 40 \text{ miles per hour as the average speed of the car.}$$





Among the Makers and Dealers



GASOLINE AND ELECTRIC SECTIONS OF GARAGE OF TOLEDO AUTO AND GARAGE CO., TOLEDO, OHIO

AKRON'S Motor Business—Akron, O., with a population of 80,000, has 1,000 motor cars in use and dealers say 500 new ones will be sold there during the coming year.

Hatfield After a Site—The Hatfield Auto Truck Co., now manufacturing light trucks in Elmira, N. Y., is reported to be seeking a desirable location with a view to increasing its output which is now four cars a day.

Duquesne Garden a Garage—Duquesne garden, for many years one of Pittsburgh's amusement centers, is soon to be remodeled into a garage. It will be one of the largest in the country. The building is owned by the Pittsburgh Railways Co. The structure was originally intended for car barns.

Can Examine Books—Judge Smith of Pontiac, Mich., has granted a mandamus compelling the Monroe Body Co. to permit Ferd H. Yeomans of Detroit, one of the stockholders, to examine the books. Yeomans alleges he has had no dividends from his stock. The examination is to be made by Yeomans or an accountant he may designate.

To Add to Lee Plant—The tire business of the Lee Tire and Rubber Co. of Conshohocken, Pa., has developed so that in 1 year it has outgrown its quarters in the spacious new factory buildings just completed, and has been compelled to place orders within the past few days for additional machinery and equipment to make possible the doubling of its present output; the intention being to equip to increase the tire production for next year from a maximum of 400 per day to between 700 and 800 per day. This improvement will entail an immediate expenditure of more than \$100,000. The power plant will be increased by a 1,200-horsepower compound Corliss engine and direct connected generator; the present mill room will be duplicated and the calenders increased three-fold, and the rubber washers will be duplicated in all particulars, as also the vulcanizers. An entirely new

compound room will be built between the two main buildings north of the bridge, with double the capacity of the present one, and the tire molds and equipment will be correspondingly increased.

Has Duplex Bearings Agency—The Globe Ball Bearing Co. of 50 Church street, New York city, has secured the American agency of the Société de Mécanique de Précision of Clichy, France, manufacturer of the Duplex bearings.

Allen Succeeds Hinkley—A change has been made at the general sales offices of the Covert Motor Vehicle Co. at Detroit. "C. C. Hinkley has gone with the engineering department of the Chalmers Motor Co., N. Gould Allen succeeding him as sales manager for the Covert Motor Vehicle Co., builders of the Covert transmissions. Mr. Allen was secretary of the Harrison Radiator Co. at Lockport, N. Y. He will now handle the sales of the Harrison company as well as those of the Covert from the one office, 1422 Ford building, Detroit.

Jeffery Estate Accounting—The final account of the late Thomas B. Jeffery, founder of the Thomas B. Jeffery Co., manufacturing the Rambler, has been filed at Kenosha, Wis. The division is as follows: Mrs. Kate E. Jeffery, one-half of the total estate, or \$1,649,222; Charles T. Jeffery, personal property to the value of \$1,013,723; Harold W. Jeffery, half of Wisconsin real estate holdings, or \$238,752; Mrs. Eva J. Carqueville, Chicago, personal property of the value of \$731,747.05; Mrs. Florence J. Hudson, St. Louis, personal property to the value of \$771,747.05. The bequest to Charles T. Jeffery consists of the entire stock and machinery of Thomas B. Jeffery & Co., now the Thomas B. Jeffery Co.

RUSSIA INTERESTED

Motor Age has received a letter from a Moscow, Russia, importation company which would like the names of American car manufacturers wishing representation in that city. Any concern requesting the name and address of this company will be given same by addressing this office.

Harold W. Jeffery will share with his mother in equal shares the real estate in other states besides Wisconsin, making his heritage practically equal to that of the other heirs.

Indiana Retailers Organize—Retail dealers of Indiana have formed a state organization. M. T. Johnson of Vincennes has been chosen president; D. Ogden of Columbus, secretary, and Roy Privitt of Greensburg, treasurer.

Mais to Expand—In anticipation of largely increasing its output during the 1913 season, the Mais Motor Truck Co. has begun the erection of a factory addition to contain 20,000 square feet of space at its plant in Indianapolis. For the 1913 season the company announces it will add several new models, so that its line will range from 1 to 4 tons capacity.

Houston Dealers Organize—The motor car dealers of Houston, Texas, recently formed the Houston Automobile Dealers' Association. Its purpose is to advance the motor car and allied interests in Houston and the state of Texas. The officers are: H. C. Skinner, president; W. H. Sprong, treasurer, and W. F. Gordon, secretary. The association expects to use its efforts and influence to secure from the state the enactment of proper laws relating to the motor interests at the hands of the legislature.

Ruling on Industrial Insurance—An interesting construction of the new industrial insurance or workmen's compensation act in Wisconsin with regard to liability for accidents or death in highway improvement or good roads work has just been placed on the law by the industrial commission of Wisconsin. The decision, made in a test case, means that county governments are liable for injuries or death to workmen engaged in road improvement according to the new state aid law. George Edminster and August Popke were injured while working in a sandpit in Waupaca county for the county highway commissioner. When compensation was asked from the county,

the case was referred to the industrial commission, which ruled that the county must pay. Edminster was awarded \$288.92 and Popke \$104.12.

Another Goodrich Incorporation—A certificate to operate in Indiana, where \$714,286 of its capitalization is represented, has been issued to the B. F. Goodrich Co. The concern is incorporated under the New York laws with an authorized capitalization of \$45,000,000.

Outlet for Old Cars—C. Arthur Benjamin, Inc., agent for Syracuse and central and northern New York for Packard cars and trucks of all types, has a novel industry in full swing. The garage, situated on West Onondaga street, has a repair shop attached. For several months operations have gone forward in this department converting second-hand Packard pleasure cars into trucks, and a number of these machines are now doing duty in the city and vicinity.

Yeats Quits Abbott—G. H. Yeats, who has been assistant sales manager of the Abbott Motor Co. for the past year and a half and prior to that service manager from the time of the organization of the company, has offered his resignation to take effect June 1. Mr. Yeats' resignation is to enable him to assume active control of the G. H. Y. Auto Supply Co., which he has just organized and will be open for business at 882 Woodward avenue on June 1. The company will handle general motor car supplies.

New Collapsible Limousine Body—A collapsible limousine which combines the features of a coach body with that of an open touring car has been built by the Columbia Motor Car Co. Its use does not change the seating capacity nor the arrangement of seats. All seven are entirely enclosed, but the front seats are not isolated from those in the rear by windows removed or lowered into the side panels making the car as free and breezy as an open touring car yet retaining the virtue of a wall. A large percentage of the side areas above the waistline is occupied by



NEW BUILDING OF JACKSON MOTOR CO., 1528 HENNEPIN AVENUE, MINNEAPOLIS, MINN.

windows which, in mild weather, can be of quick and easy protection from sudden weather changes.

Packard Ships Rental Sixes—An installment of sixes which will figure in the Packard Motor Car Co.'s European rental plan has been shipped to France. The cars will be operated in connection with the Paris service depot. The charge is \$30 a day in France and \$35 a day in other countries, the car to carry any number of passengers up to six.

New Indianapolis Concern—A puncture-proof tire will be manufactured by the Smart Mfg. Co., which has just been organized in Indianapolis with a capitalization of \$50,000 by E. R. Frye, W. E. Cummings and D. W. Reed. A temporary factory for experimental purposes has been taken in Indiana avenue, but later the company expects to obtain a much larger plant. It will be several weeks before the company will be ready to manufacture its

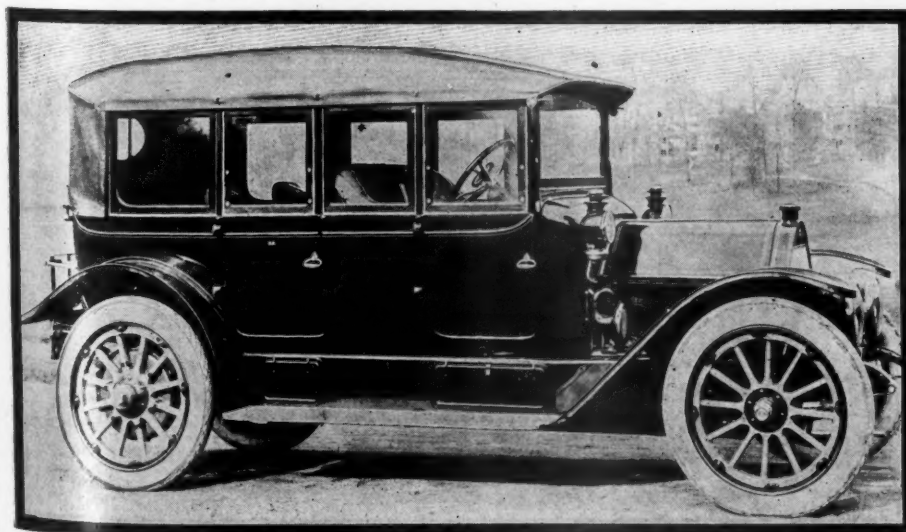
product for the market, and until that time the company will not be ready to give complete details of its product and plans.

May Be a Cole Junior—Recent additions to its engineering department and the erection of two large additions to its factory have lead to unconfirmed rumors that the Cole Motor Car Co., Indianapolis, will place a new medium-priced model on the market at the beginning of the 1913 season. The report is that the new car will be known as the Cole Junior.

Another New Chicago Store—Charles W. Price, Overland representative in Chicago, has closed a deal for a new building to be erected at 2426-28 Michigan avenue, directly across the street from his present location, 2425. The lot is 54 by 178 feet and the 10-year lease involves something like \$125,000. Price only moved into his present place about a year and a half ago.

Seeking Another Site—The Ware Vehicle Co., maker of the four-wheel drive delivery, a former Detroit institution, is negotiating with H. J. Tremain of the Minneapolis Commercial Club for the erection of a plant in Minneapolis or St. Paul to make its cars. It has a temporary assembling plant at 771 Raymond avenue, Midway. L. E. Roberts is president and J. L. Ware is manager.

Assembling Fords in Des Moines—Ford cars now are being assembled in Des Moines, Ia. The Herring Motor Co., which controls the entire state and has 274 subagencies for the Ford, has been so held back by failure to get railroad shipments that all its orders are now being filled with knocked-down cars. An assembling foreman from the Ford factories has taken charge of the Des Moines plant and large quarters in a warehouse have been rented.



NEW IDEA IN A COLLAPSIBLE LIMOUSINE BODY USED ON COLUMBIA



Current Motor Car Patents



PATENTS ISSUED MAY 14, 1912.

1,025,966—Revolving Lamp Support for Motor Car. James B. Eastes, Konawa, Okla. Filed June 3, 1911. Serial No. 631,147.
 1,025,981—Spring Wheel. Frederick H. John, Middleport, Pa. Filed June 19, 1911. Serial No. 633,947.
 1,025,986—Bulb. Howard W. Lester, Hartford, Conn., assignor to The Post & Lester Co., Hartford, Conn., a corporation of Connecticut. Filed July 29, 1911. Serial No. 641,312.
 1,025,987—Tire Tool. Adam A. Long, Rochester, N. Y. Filed July 26, 1906. Serial No. 327,882.
 1,025,998—Diaphragm Horn or Alarm. Solomon Rosofsky, Brooklyn, N. Y. Filed October 22, 1910. Serial No. 588,431.
 1,026,037—Traction Engine. Benjamin Holt, Stockton, Cal. Filed December 22, 1900. Serial No. 534,420.
 1,026,038—Tire. George S. Howe, Richmond, Va. Filed May 6, 1911. Serial No. 625,613.
 1,026,054—Magneto. Albert Schmidt, Flint, Mich., assignor to Champion Ignition Co., Flint, Mich., a corporation of Michigan. Filed March 25, 1911. Serial No. 616,965.
 1,026,073—Transmission Gearing. George W. Bulley, Chicago, Ill., assignor to Holman Equipment Co., Chicago, Ill., a corporation of Illinois. Filed February 27, 1911. Serial No. 611,249.
 1,026,077—Dual Ignition System. Charles Cuno, Meridian, Conn., assignor to the Connecticut Telephone and Electric Co., Incorporated, Meridian, Conn., a corporation of Connecticut. Filed November 10, 1910. Serial No. 591,584.
 1,026,090—Traction Engine. Benjamin Holt, Stockton, Cal. Filed August 17, 1909. Serial No. 513,309.
 1,026,091—Traction Engine. Benjamin Holt, Stockton, Cal. Filed June 13, 1910. Serial No. 566,634.
 1,026,122—Steering Wheel. Joseph L. Prather, Fresno, Cal. Filed September 7, 1909. Serial No. 516,577.
 1,026,132—Air Compressor. William R. Thompson, South Norwalk, Conn., assignor of one-half to John Tiebout, Brooklyn, N. Y., and one-fourth to Elmer E. Case, South Norwalk, Conn. Filed October 19, 1911. Serial No. 655,571.
 1,026,135—Gas Mixer. Rudolph J. Walther, Davenport, Iowa. Filed December 29, 1911. Serial No. 668,363.
 1,026,146—Steering Mechanism for Vehicles. Edward W. Bliss, Rochester, N. Y. Filed May 5, 1909. Serial No. 493,996.
 1,026,165—Rotary Engine. Franklin P. Hummel, Bellevue, Ohio. Filed September 10, 1910. Serial No. 582,679.
 1,026,189—Locking Device for Motor Car Cranks. Charles A. Wheeler, Bridgeport, Conn., assignor of one-half to the Smith & Egge Mfg. Co., Bridgeport, Conn., a corporation of Connecticut. Filed June 20, 1911. Serial No. 634,311.
 1,026,201—Spring Tire. George Burson, Winamac, Ind. Filed July 20, 1910. Serial No. 572,947.
 1,026,220—Vehicle Wheel and Axle. James E. Murray, McKeesport, Pa. Filed April 21, 1910. Serial No. 556,681.
 1,026,224—Antiskidding Device for Wheels. Marshall J. Rohr, Washington, D. C., assignor of one-fourth to Emory H. Bogley and one-fourth to John W. Bogley, Washington, D. C. Filed December 16, 1910. Serial No. 597,684.

1,026,274—Brake Mechanism. John R. McGiffert, Duluth, Minn., assignor to Clyde Iron Works, Duluth, Minn., a corporation of Minnesota. Filed October 26, 1910. Serial No. 589,218.
 1,026,279—Combined Bumper and Fender. Harry T. Myers, Chicago, Ill. Filed February 21, 1910. Serial No. 545,207.
 1,026,287—Lubricating System for Explosion Engines. Cecil Hamlin Taylor and Howard E. Coffin, Detroit, Mich. Filed June 27, 1910. Serial No. 569,205.
 1,026,291—Vehicle Wheel. Alfred R. Wylie and James G. Wright, Big Spring, Texas. Filed September 27, 1910. Serial No. 584,032.
 1,026,292—Vehicle Wheel. Alfred R. Wylie and James G. Wright, Big Spring, Texas. Filed March 14, 1911. Serial No. 614,264.
 1,026,314—Starting Device for Explosive Engines. William C. Hartmann, Milwaukee, Wis., assignor to Milwaukee Separator Co., Milwaukee, Wis., a corporation. Filed January 13, 1911. Serial No. 602,435.
 1,026,316—Spare Tire Case. Charles F. Hopewell, Newton, Mass. Filed February 2, 1912. Serial No. 674,885.
 1,026,317—Internal Combustion Engine. James F. Hopper, Sherman, Texas, assignor of one-half to Hamlet C. Smith, Sherman, Texas. Filed July 26, 1911. Serial No. 640,714.
 1,026,358—Detachable Limousine Top for Motor Cars. Oscar N. McCallister, Mount Vernon, Ind. Filed June 20, 1911. Serial No. 634,331.
 1,026,365—Wind Shield Holder. Frank P. Pfeighar, New Haven, Conn., assignor to The English & Mersick Co., New Haven, Conn., a corporation. Filed February 13, 1911. Serial No. 608,411.
 1,026,368—Vehicle Top. Alexander Ritchie, Detroit, Mich. Filed March 13, 1911. Serial No. 614,116.
 1,026,370—Vehicle Wheel. Herbert J. Sewell, Detroit, Mich. Filed May 4, 1911. Serial No. 625,012.
 1,026,373—Rail Tie Fastener. August Stilke, Buffalo, N. Y. Filed November 8, 1911. Serial No. 659,179.
 1,026,375—Driving Gear for Vehicles. Judson E. Tibbles, Macedonia, Iowa. Filed September 25, 1911. Serial No. 651,135.
 1,026,403—Explosive Engine. Robert McKee, Philadelphia, Pa. Filed March 5, 1908. Serial No. 419,263.
 1,026,408—Wind Shield. Frederick Schimper, Union, N. J., assignor of one-half to Alfred H. Koeller, Ridgefield Park, N. J. Filed January 24, 1912. Serial No. 673,020.
 1,026,425—Carburetor. Frederick Barthel, Detroit, Mich., assignor to Frederick E. Wadsworth, Detroit, Mich. Filed January 7, 1911. Serial No. 601,263.
 1,026,448—Transmission Gearing. George W. Marston, Dexter, Iowa. Filed May 27, 1911. Serial No. 629,764.
 1,026,459—Oscillating Valve. George A. Rush, Kansas City, Kans. Filed December 27, 1910. Serial No. 599,392.
 1,026,462—Transmission Mechanism. Lewis E. Schlotterback, East Orange, N. J., assignor to L. E. Schlotterback Mfg. Co., a corporation of New Jersey. Filed August 4, 1911. Serial No. 642,222.
 1,026,463—Ball Bearing. Stefan Schneider, Chicago, Ill. Filed October 27, 1911. Serial No. 657,157.
 1,026,468—Cushion Tire for Vehicle Wheels. Michel J. Selzer, Akron, Ohio, assignor to The American Tire & Rubber Co., Akron, Ohio. Filed March 2, 1911. Serial No. 611,750.
 1,026,472—Valve Lift Spacer. Charles W. Smith, Annapolis, Ill. Filed July 29, 1910. Serial No. 574,534.
 1,026,491—Carburetor. William Hull Brown, Rye, N. Y. Filed November 2, 1910. Serial No. 590,328.
 1,026,496—Vehicle Spring. Arthur Collette, Brockton, Mass. Filed December 18, 1911. Serial No. 666,401.
 1,026,499—Jack for Tightening Antiskid Chains. William F. Edington, Springfield, Ohio, assignor of one-half to Alexander Murray, Springfield, Ohio. Filed February 29, 1912. Serial No. 680,704.
 1,026,504—Steering Head for Vehicles. George Francis Garrity, Scranton, Pa. Filed February 6, 1911. Serial No. 606,993.
 1,026,505—Resilient Wheel. Adam F. Glaser, Jersey City, and John Olsen, Whippany, N. J., assignors of one-third to George W. Crane, Rahway, N. J. Filed July 19, 1909. Serial No. 508,430.
 1,026,507—Acetylene Gas Generator. James T. Hayes and Thomas C. Hayes, Emmitsburg, Md. Filed May 18, 1911. Serial No. 628,069.
 1,026,512—Compound Gas Engine. George W. Jessup, Jr., Newton, Mass. Filed September 21, 1910. Serial No. 582,975.
 1,026,527—Process to Regenerate and Improve the Structure of Lead Electrodes of Secondary Batteries. Erasmus Henry Naylor, London, England. Filed December 27, 1910. Serial No. 599,394.
 1,026,528—Starting Crank for Hydrocarbon Engines. Elias J. Patton, Michigan City, Ind., assignor of one-half to Jay P. Bergeron, Michigan City, Ind. Filed May 1, 1911. Serial No. 624,337.
 1,026,533—Auxiliary Air Valve for Carburetors. Alfred C. Stewart, Los Angeles, Cal. Filed August 16, 1911. Serial No. 644,448.
 1,026,548—Device for Stripping Wheels from Shaft. Leon F. Allien, Morgans Point, near La Porte, Texas. Filed December 23, 1910. Serial No. 598,880.
 1,026,563—Internal Combustion Engine. David H. Coles, Brooklyn, N. Y., assignor by mesne assignment to Regua Motor Co., a corporation of New York. Filed October 31, 1909. Serial No. 523,044. Renewed April 1, 1912. Serial No. 687,773.
 1,026,565—Combined Ignition System. Richard H. Cunningham, New York, N. Y. Filed April 29, 1910. Serial No. 558,442.
 1,026,584—Roller-Bearing Cage. Albert Hirth, Cannstatt, Germany, assignor to Norma Compagnie G. M. B. H., Cannstatt-Stuttgart, Germany. Filed April 11, 1911. Serial No. 620,389.
 1,026,594—Carbid Feeder. Edwin Miller, Detroit, Mich., assignor to Miller Lighting Co., Inc., Detroit, Mich., a corporation. Filed June 19, 1911. Serial No. 634,115.
 1,026,629—Reduction Gearing. John H. Macalpine, Pittsburgh, Pa. Filed September 8, 1910. Serial No. 580,975.
 Re-Issue No. 13,419—Elastic Tire. Giles S. Doty and John D. Show, Philadelphia, Pa., assignors to D. and S. Airless Tire Co., a corporation of Delaware. Filed November 10, 1911. Serial No. 659,663. Original No. 1,002,046, dated August 29, 1911. Serial No. 601,889.

MOTOR Lubrication System—No. 1,026,287, dated May 14; to Cecil Hamelin Taylor and Howard E. Coffin, Detroit, Mich.—As illustrated in Fig. 2, this patent pertains to a circulating splash oiling system for internal combustion motors such as now is in common use in many motor car engines. The lower portion of the crankcase is divided by a horizontal partition which separates the splash receptacles above from the main oil reservoir below. The upper surface of this partition is itself divided into splash basins, by a series of vertical transverse partitions. Overflows are provided in these basins, through which the oil drains back into the main reservoir below, after the required level is reached. A pump is provided to draw the

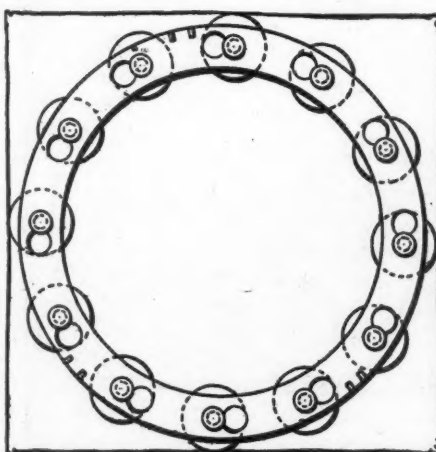


FIG. 1—HIRTH ROLLER BEARING

lubricant from the main reservoir below and force into the splash basins, and also into a compartment at the top of the engine.

Demountable Roller Bearing Cage—No. 1,026,584, dated May 14; to Albert Hirth, Cannstatt, Germany—This patent relates to a roller bearing cage comprising, as indicated in Fig. 1, a ring, bolts attached to the ring, rollers mounted on the bolts, a second ring fitting flush onto the free ends of the bolts, and a third ring adapted to be brought into engagement by turning with grooves in the ends of the bolts in order to prevent the second ring from slipping off the ends of the bolts.

Revolving Motor Car Lamp Support—No. 1,025,966, dated May 14; to James B.

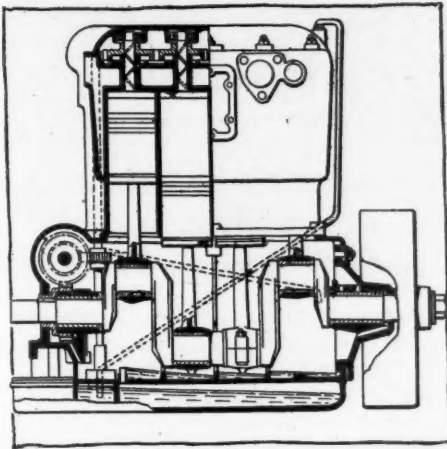


FIG. 2—TAYLOR & COFFIN LUBRICATION

Eastes, Konawa, Okla.—The lamp revolving mechanism to which this patent relates is illustrated in Fig. 3, and comprises a

simple means of swinging pivotally mounted headlights so as to direct their light rays into the direction in which the vehicle is steered. Vertical rods connected to the revolvable lamp brackets, have a non-circular section engaged by slots in horizontal arms or bars that communicate with the tie rod of the steering gear. Thus as the tie-rod, or connecting link between the steering arms of the road wheels, is moved sidewise, the ends of the horizontal bars attached thereto, are swung around, carrying the vertical pivot rods, which operate the lamp-brackets, around with them.

Magneto Distributer Construction—No. 1,026,054, dated May 14; to Albert Schmidt, Flint, Mich.—This patent applies to a magneto distributing mechanism comprising a contact disk having an insulated contact plate, a rotatable member of insulating material, a brush movable in this member, and a two-arm bow spring detachably se-

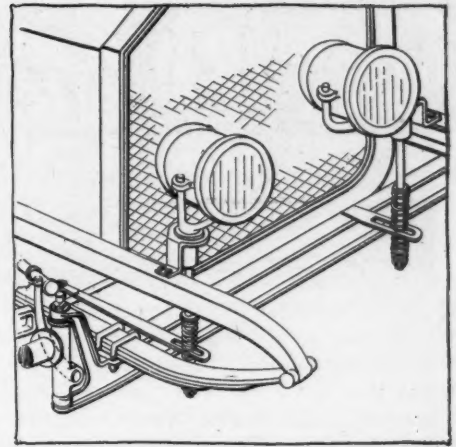


FIG. 3—EASTES REVOLVING LAMPS

cured on the face of this member, engaging opposite sides of the brush for moving it into co-operation with the contact plate.

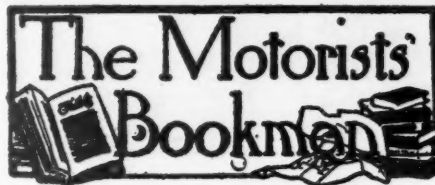
Bearings and Lubrication

“**B**EARINGS and Their Lubrication” is the name of a new book written by L. P. Alford, M.E., editor of the American Machinist. The aim of the book is to present the underlying principles involved in the design of all classes of machinery bearings and to show modern practice in the construction and application of important commercial types. Many of the experiments and researches quoted are from European sources and official transactions of technical societies, and are not generally known to American readers.

The volume is divided into two parts: Part 1 pertaining to bearings with sliding contact; and part 2 to bearings with rolling contact. All data is systematically arranged and thoroughly indexed so as to be permanently useful to engineers, designers, draftsmen and machinists; in fact, to any one who is interested in any way with machinery and its proper lubrication and care. The book begins with a classification of machinery bearings; then follows part 1 with sections on sliding friction; coefficients of friction of journal, collar, step and guide bearings; materials for bearings; allowable pressures, speeds and temperatures; design of journal bearings; lubricants; design of flat sliding surfaces and special bearings; three important bearings inventions; typical designs and constructions; and hints on the care of bearings. Part 2 covers: Rolling friction and factors of design; construction of ball bearings; typical designs and mountings for ball bearings; lubrication of ball bearings; roller bearings with flexible rollers; radial roller bearings with solid rollers, and roller thrust bearings.

The West Country.

Another of the Homeland books is “The West Country,” descriptive of Somerset, Dorset, Devon and Cornwall, charmingly illustrated, as are all of the series put out by the association. One chapter is devoted to books on this section, another to golf. One on “Motoring in the West



Country” contains a sketch map showing the principal roads through these four counties from Bristol to Land's End, with suggestions as to good motoring centers. Several day's runs are suggested, giving distances, etc. Half of the book is given over to practical notes arranged alphabetically by towns, villages and districts. This pocket volume may be obtained in this country from Frederick Warne & Co., New York.

Yankees of South America

The relative geographical position of North and South America is little realized, and one is inclined to question the fact that New York and Valparaiso are crossed by the same parallel of longitude until the atlas has been consulted. That so direct a line of communication can soon be established between the eastern seaboard of the United States and the west coast of South America produces a growing interest in all of those countries lying to the south. Especially is this true of Chile, a country unique in its geography and history, with a people maintaining for 300 years their struggle for freedom from an alien dominion. A deal of information regarding this unconquerable people, styled “the Yankees of South America,” is given by Nevin O. Winter in “Chile and Her People of Today,” a volume of 400 pages.

Portions of the book read like fairy romance, for it seems unreal to the North American mind that this country should have been occupied by a centuries-old civilization when Jamestown was settled. But the author says, “Arica is a pleasant little place of several thousand inhabitants. From this city a highway runs into

the interior which was constructed by the Incas a thousand years ago, and has been used ever since. Today caravans of mules, donkeys and llamas may be seen constantly passing up and down this ancient trail.” Geographical, historical, social, political and prospective features are treated in this interesting volume, which is uniform with others in the series. Published by L. C. Page & Co., Boston, Mass.

America's Wonderlands

To those who have already visited the Yellowstone, the Yosemite, or the Grand canyon of the Colorado river, the “Three Wonderlands of the American West” will bring refreshing memories; in those who have not yet gazed on these soul-inspiring works of Nature the book will certainly create a longing and desire to see and know more and more of the grandeur and beauty of our country.

The book has a wealth of beautiful reproductions in color of Moran's famous paintings of these wonderlands, sixteen in all; besides, there are a score or more duogravures from photographs. In comparing the glories of the three wonderlands the author says the Yellowstone impresses one with its weirdness and vastness; in the Yosemite, beauty is the predominating feature; while in the Grand Canyon beauty and weirdness strive for mastery. Thomas D. Murphy, Published by L. C. Page & Co., Boston, Mass.

Installation Manuals

A very compact little volume is R. George Devey's “Mill and Factory Wiring,” one of a series in the Electrical Installation Manuals issued by Constable & Co., Ltd., London, England. The book discusses the subject of installation, electric wiring and electric apparatus as affected by the processes of manufacture, and then takes up in order the subject of wiring and connections for electric power and light, wiring calculations and tables, and the lay-out of wiring network in factories.



Development Briefs



Pneumatic Shock Absorber— M & M Gas Economizer— New Emergency Brake

SHOCK absorbers of the pneumatic type are one of the recent innovations in motoring accessories. The latest of these is the Air shock absorber made by the Kilgore Mfg. Co., Boston, Mass. Two sectional views are offered in Fig. 5, the one at the left showing its attachment to the car. This absorber relies for its action and efficiency upon the resiliency of air, the manufacturers believing that through this medium the minimum amount of friction is encountered and the maximum amount of reliability. The Air shock absorber is made up of a cylinder, piston, piston head and drawn-brass mudguard, together with the necessary universal couplings for attaching the absorber to the axle and frame.

The piston rings are made of fine-grained rock maple, thoroughly air-seasoned, shaped to nearly the required size, then treated in a process that thoroughly saturates the grain with a preparation of oil wax and grease and makes them frictionless. They are then finished to fit the piston and cylinder. The cylinder is made of bronze and a bypass is cast integral with the cylinder and allows the passage of air from the space above to the space below the piston and vice versa, depending upon whether the machine is going down or recoiling. The piston rod is packed with a leather washer. Over the wearing portion of the piston rod, is placed a leather dust cap, protecting it against inroads from dust. This space also is utilized, having an amount of lubricant sufficient to last during the life of the absorber. Over

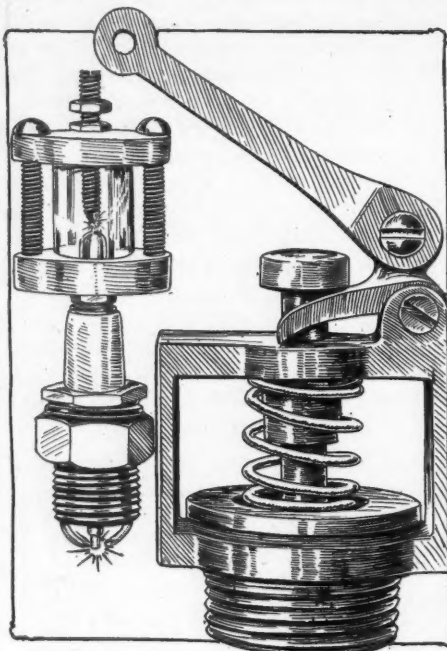


FIG. 2—HEMMETER SPARK GAP AND M. & M. GAS ECONOMIZER

this entire apparatus is placed a brass mudguard, on the top of which is a cap containing a universal joint which is attached to the piston rod.

There is no necessity of auxiliary rubber bumpers or straps as this shock absorber controls the down stroke as well as the recoil of the machine. The inventors' idea is that the car needs a certain amount of easance in going down as well as the recognized checking of the recoil. Air is a good medium with which to accomplish these results as it has resiliency, and at the bottom and top of the play in this shock absorber, the air cushion as formed, limits the action of the springs

Hemmeter Spark Gap—Vul- cum Tire Repair—Col- R-ol Leather Dye

in both directions. Friction is not depended upon, in the slightest. The initial adjustment to the spring action of a car is all that is necessary and this adjustment can be made accurately. On heavy cars with light springs a small check valve is placed in the bypass which further retards the escape of air from the upper space to the lower on the down stroke.

M & M Gas Economizer

There are upon the market numerous devices designed to improve the mixture entering the cylinders from the carburetor, but the M & M economizer, illustrated at the right of Fig. 2, goes a step farther than this. In addition to the function of supplying additional air as it is needed, the device can be used simultaneously to stop the induction of gas from the carburetor, break the electric circuit, and supply nothing but pure air to the cylinders. On going down grades or slowing for crossings or stops, this permits the clutch to be left in so that the compression of the motor acts as a brake, at the same time scavenging the engine and saving the ignition. This is accomplished by a pipe-threaded base in which there are two spring-seated valves, one having four small holes, one or more of which may be opened to admit varying quantities of air to the manifold as the car speeds up. The other valve opens the manifold to the air and prevents the suction in the cylinder from drawing gas from the carburetor. A connection to the ignition wiring is arranged so that when the latter valve is operated the ignition circuit is opened and no spark

SIMPLICITY of control is one of the features of the Utility car, and in obtaining this simplicity the Gaylord Motor Co. has cleared the forward compartment of all but one lever. In one of

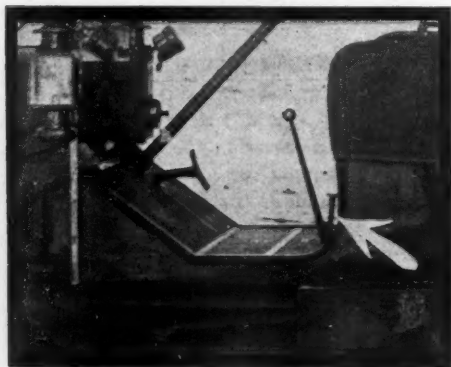


FIG. 1—FRONT COMPARTMENT OF UTILITY CAR.

Utility Emergency Brake Operation by Pedal Makes Only Lever on Gaylord Product Operate Gearshift

the illustrations is a view of the forward seat, showing the single control lever, the gearshift lever which is located in the center. The emergency brake, which ordinarily is operated by a lever, in this car is operated by a heel button which is as unobtrusive and as easy of application as the muffler cut out. The emergency brake button and its connections to the brake are illustrated in the other view. The button is operated by the right heel, so in the control of the car there is but one lever, in the center, and one foot pedal for clutch and service brake, leaving the right foot free to oper-

ate the accelerator and the emergency brake. Fig. 1 shows how the forward compartment is closed and Fig. 3 is a view of the brake connections from pedal to brake rod.

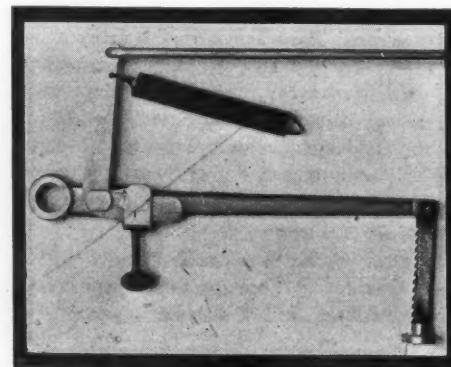


FIG. 3—UTILITY EMERGENCY BRAKE MEMBERS

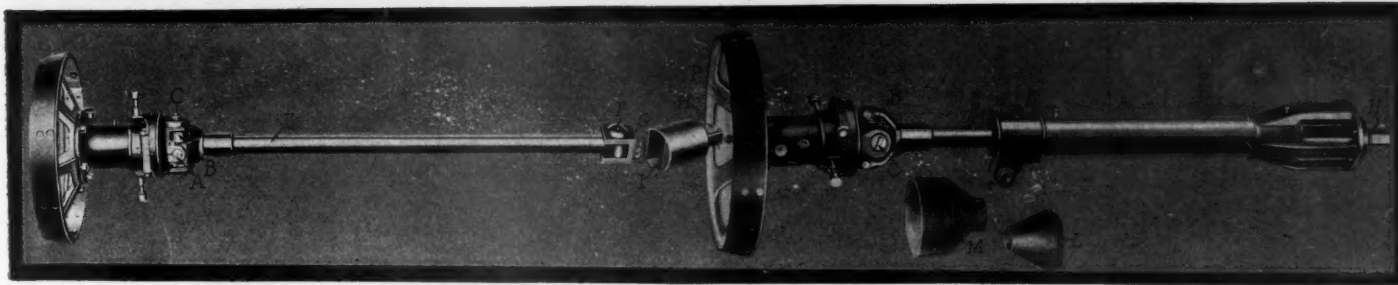


FIG. 4—DETAILS OF PROPELLER SHAFT OF REGAL CAR

ON the Regal cars there is employed a construction of propeller shaft and universal joints that differs somewhat from ordinary practice. The transmission gearset is carried on the rear axle and the drive is through an inclosed shaft equipped with two universal joints. Extending forward from the gearcase is a torsion tube T which serves the double purpose of a torque member and a casing for the propeller shaft E. To the forward end of the torsion tube is fitted a sleeve K which, in turn, is hinged to an anchor lug carried on the cross member of the frame. The tube is permitted to rotate in the sleeve and there is provision as well for lateral movement. The inside diameter of the tube is great enough to permit of the necessary lateral movement of the shaft as the frame and body of the car moves up and down on the springs. The forward end of the shaft is carried

Regal Propeller Shaft Detail of Transmission Members of Car Explained and Illustrated

on the rear end of the clutch hub and the rear end is supported on the sleeve I which is carried on the shaft H, the rear end of which is squared and fits into the transmission sleeve gear. The bronze trunnion block G is fitted in the slot of the rear shaft, and inasmuch as two sides of it are spherical, the angular movement of the shaft in its plane is permitted. Movement of the shaft in the plane at right angles is permitted by the trunnion pin which passes through the block and the rear end of the trunnion shaft.

The forward universal joint is of the block and pin type, the pin C being a steel tube through which the pin A passes. The

block B, is made of bronze. The hollow pin C is provided with a plug at either end which can be removed and the pin filled with lubricant, to oil the inner parts of the joint. The whole forward joint is covered with a leather boot. When the clutch is thrown backward for disengagement, the whole propeller shaft travels with it, the sliding movement taking place between the trunnion block G and the rear shaft H. An advantage claimed for this construction is, that no exact alignment between motor and rear axle is necessary, and there are no strains on the frame to bind the driving members.

Fig. 4 shows two views of this portion of the Regal transmission system. At the left is illustrated the clutch propeller shaft and universal joints with the torsion tube removed; at the right is the propeller shaft and clutch with the torsion tube in place.

occurs. The first valve is automatic while the second is operated by a toe button through the lever indicated on the top of the attachment. The economizer is the product of Moller Bros. Controller and Economizer Co., Philadelphia, Pa.

Hemmeter Spark Gap

At the left of Fig. 2 is illustrated an attachment to the spark plug to provide an outside spark gap. It is manufactured by the Hemmeter Spark Gap Mfg. Co., Pontiac, Mich. It is designed to prevent the spark plug from becoming inoperative through soot. As a secondary function, it is intended to prevent any leakage of current through defective plug insulation by interrupting the flow of current until the voltage has been raised sufficiently to suddenly break down the resistance of the auxiliary gap and also that of the plug. This results in a discharge through the air gap between the plug points instead of the sooted surfaces of the plug insulation. This auxiliary gap is composed of two pieces of fiber countersunk and with a short piece of gauge glass inserted around the gap and held in place between the fiber portion by two brass machine screws. A fire pin inserted in the top of the device consists of an adjustable screw which makes contact and forms the auxiliary gap. In the bottom fiber piece is a terminal made to fit any standard plug. When the gap is adjusted properly to the ignition system, it is claimed to make an

old carbonized plug fire and to keep a clean plug from becoming sooted or carbonized when in regular ignition use.

Vulcum Tire Repair

The Richardson Tire Co., Hartford, Conn., has made a recent improvement on its self-vulcanizing process. To distinguish this improved tire repair process from its original one, called Vulco, it has given it a new name Vulcum. The Vulcum process is a vulcanizing process but it differs from the method ordinarily used in that it is not necessary to apply heat.

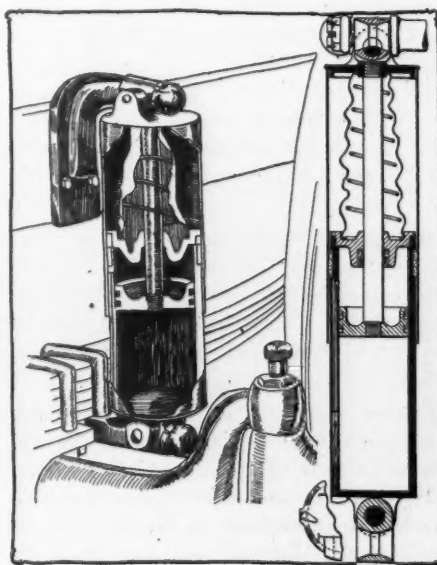


FIG. 5—AIR SHOCK ABSORBER

The compound cures upon exposure to the air, the article to be repaired having been properly treated and prepared for it. The Vulcum outfit consists of four parts: the softener, to make the original rubber porous, the repairer, to penetrate the rubber and provide a sticking surface for the third part which is the Vulcum. This is a vulcanizing compound of nearly pure rubber, which upon exposure to the air vulcanizes into the original rubber to be repaired. Lastly, the hardener, a powder rubbed upon the surface to toughen the outside of the repair. It is stated that an ordinary repair with Vulcum can be made in not more than 5 minutes working time. As soon as the repair of a tube is finished it may be put into service, although it is better to allow the tube 30 minutes to cure. A repair in a casing should not be used for at least 2 hours after the Vulcum has been applied.

Col-R-01 Leather Dye

A preparation for renewing the color of the leather upholstery is marketed under the name of Col-R-01 leather dye. This is claimed to act as a dye that penetrates and colors the leather without the use of leather primer, giving it a new finish that does not wear off. The reason for its permanence is claimed to be that the dye penetrates the pores of the hide. It is insoluble in water and waterproofs the leather to which it is applied. It dries in ½ hour and is a product of Rub-On Varnish Co., Buffalo, N. Y.



Brief Business Announcements

Recent Agencies Appointed by Car Manufacturers

PLEASURE CARS

Town	Agent	Make
Auburndale, O.	Thomas W. Bunnell	Cutting
Buffalo, N. Y.	Henry Brunn	Hupmobile
Boston, Mass.	Flanders Mfg. Co.	Flanders
Boston, Mass.	C. J. Fisher Co.	Garford
Boston, Mass.	C. J. Fisher Co.	Marion
Cedar Rapids, Ia.	Berton Ford Motor Co.	King
Coeur d'Alene, Ida.	Charles Perrault	Ford
Cornell, Ill.	J. H. Reichhardt Co.	R-C-H
Decatur, Ill.	G. F. Wisegarver	R-C-H
Freeborn, Minn.	Fred Fiene	R-C-H
Guelph, Ont.	Guelph Motor Car Co.	Russell
Guelph, Ont.	Guelph Motor Car Co.	Everitt
Guelph, Ont.	Guelph Motor Car Co.	Hupmobile
Hartline, Wash.	W. R. Keys	Hupmobile
Lancaster, Pa.	D. W. Ranck	Havers

Town	Agent	Make
Monmouth, Ill.	Weir-Moore Motor Co.	R-C-H
Milton, Pa.	George W. Slocum	Havers
Masbach, Ill.	Rudolph Dittmar	R-C-H
Oakland, Cal.	Hugo Muller	Oakland
Pomona, Cal.	Clark's Garage	R-C-H
Raleigh, N. C.	Capitol Motor Car Co.	R-C-H
Riverside, Cal.	Crescent Garage	R-C-H
Richmond, Va.	Coleman Cutchins	King
Shepherdstown, W. Va.	George W. Billmyer	Maxwell
Toronto, Can.	Bouvier & Son	Havers
Tucson, Ariz.	Alfred S. Conau	R-C-H
Toronto, Ont.	Brasier & Gourley	Warren
Washington, D. C.	G. R. Cowie	Cole
York, Pa.	C. E. Motter & Co.	Stanley

TRUCKS

Town	Agent	Make
Boston, Mass.	C. J. Fisher Co.	Garford
Boston, Mass.	C. J. Fisher Co.	Gramm
Boston, Mass.	C. J. Fisher Co.	Overland
Syracuse, N. Y.	F. P. Anderson	Alco
Syracuse, N. Y.	T. A. Young	Peerless
Syracuse, N. Y.	W. R. Shaw	Sandusky

Town	Agent	Make
Syracuse, N. Y.	W. R. Shaw	Kelley
Syracuse, N. Y.	James Auto Co.	Federal
Syracuse, N. Y.	Overland Syracuse Co.	Garford
Syracuse, N. Y.	W. H. Bissell	I. H. C.
Toronto, Ont.	Brasier & Gourley	Warren

DUNCAN, B. C.—The Cowichan Motor Co. has opened a garage in Duncan, B. C.

Montreal, Quebec—The Motor Tire Import Co. is handling the G & J, Continental and Jenatzy tires.

Minneapolis, Minn.—The Federal Rubber Mfg. Co. has opened a new branch show room at Fourteenth street and Hennepin avenue.

Duluth, Minn.—The Zenith Tire Service Co. has been incorporated at \$50,000. Incorporators are Walter D. Rightmire, Harold C. Russell, Alice E. Rightmire.

Calgary, Alta.—V. DeMille is building a \$30,000 two-story brick garage at Calgary, on Eleventh avenue. It will have a frontage of 50 and a depth of 120 feet.

Milford, Utah—William Martin of the Milford Garage Co., at present operating a motor stage line between this city and Beaver, has announced his intention of opening a garage and selling cars also.

Minneapolis, Minn.—The B. F. Goodrich Co. of New York, \$45,000,000 capital, reincorporated, has filed articles with the secretary of state in Minnesota. Of the capital \$156,800 is invested in Minnesota.

Indianapolis, Ind.—R. D. Eaglesfield, J. H. Darlington and G. W. Fuller have organized the White Automobile Co., which has been incorporated with a capitalization of \$2,000. The company will handle the White agency.

Indianapolis, Ind.—The Meridian Auto Co. has sold its business and property at 724 to 730 North Meridian street to the Waverley Co. The Meridian company has had the Waverley agency and the factory will use the property as a factory sales branch and garage for electric cars. The

new branch will be under the management of Henry C. Churchman.

Minneapolis, Minn.—G. Knutzen will take the agency for the J. M. shock absorbers at 98 Eleventh street S.

Buffalo, N. Y.—The Remy Electric Co. has established a service station here, the Frey Auto Supply Co., 700 Main street, being the connection.

Phoenix, Ariz.—The Collings Vehicle and Harness Co. has taken the agency for I. H. C. trucks. Next fall the Arizona Motor Co. will sell Studebaker trucks.

Kalamazoo, Mich.—The Kalamazoo Vulcanizing Co. has been formed by Herman Triestram and Clare Bureleigh. The plant will be located at 112 North Burdick street.

Boston, Mass.—The Flanders electric is now represented by a branch with V. C. Kraemer in charge, salesrooms having been secured temporarily at 883 Boylston street.

Phoenix, Ariz.—W. F. Brong and Charles H. McArthur have formed a partnership and are now selling the Case. They also are handling the Case line of farm machinery.

Manitowoc, Wis.—The Wisconsin Aluminum Foundry Co. has been organized, with an authorized capital of \$35,000, by Henry Stahl, Bruno Dallwig and Abram Schwartz. The company will engage in the aluminum casting business.

Seattle, Wash.—The newly incorporated American Motor Car Co. is building on Broadway next to the Lozier sales rooms and shops, now in course of construction. The new company has F. H. Boynton as president and Leonard McClure as manager. The property of the American

Motor Car Co. has a frontage of 180 feet and a uniform depth of 130.

Evanston, Wyo.—A garage and salesroom will be opened at once under the management of L. E. Raney.

Edmonton, Alberta—J. J. McKenzie is erecting a brick building with a frontage of 40 feet to be used as a garage.

Sale Lake-Ogden, Utah—The Bertram Motor Co. has opened a branch at 2564 Washington avenue. This firm already operates exclusive houses at Salt Lake City, Utah, and Boise, Idaho. Louis A. Vidy will be in charge.

Minneapolis, Minn.—The Waverley Electric Vehicle Co. has been formed to handle the Waverley line in Minnesota, North and South Dakota. The Jackson garage at 1526 Hennepin avenue is headquarters, with F. B. Stone manager.

Phoenix, Ariz.—The Arizona Motor Co., state agent for the Studebaker cars, has leased the old Tremaine garage, with a floor space of some 600 feet, and is using it as an annex. W. D. Tremaine has moved into a new building at Seventh avenue and Adams street.

Des Moines, Iowa—The Cunningham Auto Co., agent for the American line, has disposed of its business to the Central Iowa Motor Co., a new organization in the local field. A. W. Cunningham, formerly manager, has gone into the second-hand car field.

Douglas, Ariz.—The Douglas Auto Co. has been succeeded by the Borderland Auto Co. H. W. Dixon is president; J. C. Pettit, vice-president and general manager; W. C. Corey, secretary and treasurer. Mr. Corey is the new member of the combination and

will handle the business end. A modern garage is to be erected at once.

Columbus, Ohio—The Rogers Supply and Tire Co., Fourth and Spring streets, will conduct a Remy service station.

St. Paul, Minn.—The R. W. Munzer & Sons Co. has taken the agency for the Midland. The company has the Hupmobile also. The Midland territory is Minnesota, North and South Dakota.

New York—Joseph Tracy and H. F. Donaldson, who joined interests recently, have removed to 1786 Broadway, New York. The testing laboratory at Rutherford, N. J., will be continued as part of their plant.

St. Johns, N. B.—It is proposed to establish a motor car manufacturing plant here this summer. Probably 500 hands will be employed. Names associated with the new concern are J. A. Pugsley, M. D. Coll and Charles Nevins, Jr.

Boston, Mass.—C. J. Fisher has just formed the C. J. Fisher Co. and opened salesrooms at 1022-1024 Commonwealth avenue. Mr. Fisher has the Boston agency for the Gramm, Garford and Overland commercial vehicles and the Garford and Marion pleasure cars.

Conshohocken, Pa.—The Seldom Motor Car Co., of Houston, Tex., has taken on the sale of Great American tire for south and southwest Texas. The E. S. Sporting Goods and Auto Supply Co., of Athens, Ga., has recently taken on the sale of Great American tires. J. B. Mc-

Clelland, of Sault Ste. Marie, Mich., is another new agent.

Syracuse, N. Y.—The Abbott-Detroit Sales Co. has opened its new garage at South Clinton street, near Tallman.

Oakland, Cal.—The Frank O. Renstrum Co. of San Francisco has recently opened a branch store in Oakland, where it will also handle Regal and Kline cars.

Phoenix, Ariz.—The Mitchell is no longer represented in Arizona. After a disagreement with the company, W. D. Tremaine of Phoenix relinquished the state agency. Hereafter he will handle only Cadillac and Hudson cars.

Ingersoll, Ont.—John C. Coleridge proposes to establish a motor truck manufacturing plant at Ingersoll. The company intends to build on 3 acres of land and it is the intention to install \$20,000 worth of equipment inside of a year.

Findlay, O.—A company has been formed at North Baltimore for the manufacture of motor trucks, with the following officers: President, John Wilt; vice-president, F. W. Spitler; treasurer, Bert Mong; secretary, Will Wirt; mechanical engineer, Park Campbell; exclusive salesman, Gus Bosler.

St. Paul, Minn.—The Northwest Kissel Kar Co., Minneapolis, has leased property at 237 West Main street for a sub-branch. The building is to be 60 by 150 feet, two stories and basement, of the style of the Minneapolis building. It is to be ready August 15. John F. Lynch, manager of

the present agency at 441 St. Peter street, will have charge.

Humboldt, Sask.—S. A. Schneider, late of Minneapolis, and J. H. Thiemann are opening a motor car business to be known as the Imperial Automobile Co.

Grand Rapids, Mich.—A. L. Albee and H. F. Baxter have formed a partnership to handle motor cars and accessories under the name of the Alpena Motor Sales Co. with headquarters at 130 Crescent street N. W. They will represent the Alpena.

Windsor, Ont.—The National Automobile Body Co., Ltd., has been organized here with \$150,000 capital. The company will manufacture bodies of wood, steel and aluminum. A site covering 3 acres already has been purchased in the factory district. One hundred hands will be employed at the start.

Montreal—R. F. Girdwood, who has been the Montreal manager for the Ford company's Montreal branch, has severed his connection with that company and has accepted the local agency for the Reo. He will locate a garage, showroom and repair shop at the corner of Guy and Dorchester streets.

San Francisco, Cal.—San Francisco is soon to have another pretentious motor car building. It will be the home of the Pan-American Motors Co., northern California distributor of the Moon and Michigan cars. The building will cover practically a 50-acre lot and will represent an investment of \$300,000.

Boston, Mass.—Michigan Motor Co., capital stock, \$50,000; president, W. E. Burke; treasurer, L. Furry.

Buffalo, N. Y.—Electric Shop, capital stock, \$50,000; electrical work and deal in supplies; incorporators, L. W. Wiperman, E. F. Flach, J. Hora, Jr.

Camden, N. J.—Standard Auto-Sales Co., capital stock \$150,000; general motor car business; incorporators, C. H. Friars, E. H. Weaver, R. M. Snyder.

Camden, N. J.—Point Breese Motordrome Ass'n., capital stock, \$50,000; general motor car business; incorporators, F. Dittmar, W. C. Sykes, A. R. Sloan.

Charlotte, N. C.—Como Automobile Supply Co., capital stock \$50,000; incorporators, M. Jones, C. C. Coddington, M. M. Jones, M. L. Coddington.

Cincinnati, O.—Ideal Garage Co., capital stock, \$6,000; incorporators, A. J. Summer-ville, I. A. Summerville, B. C. Summerville, W. J. Burrer, W. G. Valentine.

Cincinnati, O.—Ohio Motor Car Sales Co., capital stock, \$100,000; to manufacture and sell motor cars; incorporators, C. F. Pratt, A. E. Schaeffer, H. T. Goulden, J. E. Brady, S. C. Roettinger.

Cincinnati, O.—Eddy Automobile Co., capital stock, \$5,000; to operate garage; incorporators, H. T. Eddy, F. A. Wagner, A. C. Shattuck, D. J. Cox, A. C. Shattuck, Jr.

Clarendon, Va.—Ford Auto and Truck Co., capital stock, \$1,000 to \$25,000; president, E. H. Bauer; secretary, W. W. Barnes.

Cleveland, O.—West 25th Supply and Garage Co., capital stock, \$10,000; garage and supplies; incorporators, H. W. Luis, F. M. Brady, K. Louis, T. J. McCarty, M. A. McCarty.

Cleveland, O.—Eureka Electric Co., capital stock, \$15,000; incorporators, A. S. Dole, H. H. Coyne, S. Lazarus, W. Rotheberg, W. R. Miller.

East Orange, N. J.—Eastern Motor Racing Ass'n., capital stock \$50,000; to manufacture motor cars, etc.; incorporators, H. H. Pickling, C. O. Geyer, F. E. Ruggles.

Hessville, Ind.—Standard Rubber Tire Co., capital stock, \$20,000; to manufacture tires and rubber goods; directors, E. D. Loewenthal, O. A. Wheeler, H. Williams.

Highland, Pa.—Highland Auto Co., capital stock, \$3,000; incorporators; H. McKibben, G. Hamilton, T. Turner.

Recent Incorporations

Hinsdale, Ill.—Hinsdale Auto Co., capital stock, \$15,000; general motor car business; incorporators, A. E. Keith, E. Keith, M. Setter.

Houston, Tex.—Herrishoff Motor Car Co., capital stock, \$5,000; incorporators, R. W. Johnson, E. L. Bender, Jr., W. F. Tarver.

Louisville, Ky.—Commercial Motors Co., capital stock, \$10,000; to buy, sell and rent motor cars; incorporators, H. D. Fitch, R. J. Hurt, R. E. Scharm.

Morristown, N. J.—Spencer Wilkie Motor Car Co., capital stock, \$30,000; general motor car business; incorporators, E. A. Carpenter, G. P. Spencer, W. W. Wilkie.

Newark, N. J.—North Jersey Auto Supply Co., capital stock, \$30,000; general motor car business; incorporators, M. Permisson, E. C. Mohrof, C. G. Butler, F. W. Mead.

New York—Suburban Equipment Co., capital stock, \$10,000; to manufacture and deal in machinery, motors, etc.; incorporators, H. O. Itis, C. A. Parker, W. P. Barker.

New York—Acton Tire Repair Co., capital stock, \$3,000; incorporators, Patrick Curry, W. Koopman, L. Kerrigan.

New York—Suburban Equipment Co., capital stock, \$10,000; to manufacture gasoline engines, etc.; incorporators, H. G. Otis, W. L. Otis, C. A. Barker.

New York—Simplex Aluminum Solder Co., capital stock, \$25,000; to manufacture aluminum solder, mend motor car parts, etc.; incorporators, C. R. Erkens, C. Decker, H. Bender.

New York—Ball Bearing Novelty Co., capital stock, \$6,000; to manufacture devices for motor cars, etc.; incorporators, A. B. Greenberg, A. Dioneer, J. Solomon.

New York—Sherman Square Auto Renting Co., capital stock, \$3,000; incorporators, W. S. MacMichael, W. G. Johnson, J. T. Goodwin.

New York—C & C Auto Co., capital stock, \$500; incorporators, J. H. Ciancimino, E. R. Ciancimino, F. L. Ciancimino.

New York—Motor Traction and Engineering Co., capital stock, \$20,000; general trucking; incorporators, H. Waltermeyra, G. H. Pride, E. Sayer.

New York—Marion Motor Car Co., capital stock, \$1,125,000.

Pasadena, Cal.—Pasadena Motor Car Co., capital stock, \$20,000; incorporators, A. B. Case, J. C. Cook, B. I. Robinson.

Philadelphia, Pa.—Diamond Motor Car Co., capital stock, \$10,000; to manufacture and deal in motor vehicles; incorporators, C. W. Runlett, C. W. Jaycox, F. Davis.

Pittsburg, Pa.—Auto Supply Co., capital stock, \$50,000.

Pittsburg, Pa.—Alpine Motor Co., capital stock, \$25,000; incorporators, H. F. Bott, C. Z. Pote, J. F. Sweeney.

Savannah, Ga.—Savannah Auto Repair Co., capital stock, \$10,000; incorporators, W. T. DeBorde, D. D. Pounder, S. Myrick.

Springfield, O.—Gem Garage Co., capital stock, \$10,000; to deal in motor cars and accessories; incorporators, C. J. Watts, E. M. Watts, L. V. Watts, F. J. Eberle, C. M. Strunk.

Springfield, Mass.—Blue Ribbon Garage Co., capital stock, \$2,000; incorporators, A. Karp, H. Bland, J. G. Gottesman.

St. Charles, Ill.—St. Charles Specialty Mfg. Co., capital stock, \$10,000; to repair motor cars; incorporators, L. H. Jensen, H. G. Hempstead, M. M. Andrews.

St. Johnsbury, Vt.—Consolidated Automobile Co., capital stock, \$10,000; to deal in motor cars, accessories, supplies, etc.; incorporators, H. B. Blossom, H. B. Howe, M. L. Lacasse.

Tampa, Fla.—Mitchell Auto Sales Co., capital stock, \$15,000; incorporators, M. B. Hub-ber, Van Duzen, F. M. Williams.

Toledo, O.—Disco Auto Starter Co., capital stock, \$10,000; incorporators, H. A. Cavanagh, R. S. Holbrook, L. R. Roper, B. H. Whitney, C. R. Banker.

Watertown, Mass.—Bemis Rubber Co., capital stock, \$75,000; president and treasurer, W. C. Cogswell.

Youngstown, O.—Poland Transit Co., capital stock, \$3,000; transportation business; incorporators, W. F. Leedy, F. H. Shilling, F. M. Wick, I. C. Shilling, R. C. Randle.



The Motor Car Repair Shop

NOTWITHSTANDING the fact that piston rings and grooves generally are made to a standard size, a little hand fitting very often is required; variations in the size of the piston rings and grooves of a single piston, therefore, make it necessary to have some method of properly replacing the rings in their respective grooves after they have been removed for a cleaning or inspection.

In order to facilitate getting the piston rings back in their proper grooves, a very simple and ingenious device is used by a workman in the Packard agency's repair-shop, Chicago. The device, as illustrated in Fig. 2, consists of a piece of sole leather about $\frac{1}{4}$ inch thick, having perforations about $\frac{3}{8}$ inch in diameter arranged in four rows of four holes each. The piston rings, as they are removed from the pistons, are slipped into these perforations in the order in which they are removed. For instance, the top ring from No. 1 cylinder might be placed in the upper right hand hole, the second ring from the piston head would be placed in the next hole in the top row, etc. The rings from the No. 2 cylinder would be placed in the second row of holes from the top in the same way, those of the third cylinder piston in the third row from the top, and the rings from No. 4 piston in the bottom row of perforations.

Thus in replacing the rings, the ring that belongs in the bottom groove of No. 1 piston, occupies the most readily removable position on the ring holder, and the bottom ring generally is the first one to be assembled into place, then the ring in the second groove from the bottom follows, then the second, and the top rings. A smaller perforation centrally located near the top of the leather card, provides for hanging the card on a hook or nail in some conveniently out-of-the-way place while disassembled. This simple object can be used to good advantage in many repairshops where it is customary to arrange the rings in a pile on the bench, or hang them on a nail, where they may be easily damaged, or at least accidentally thrown into disorder, that might cause much trouble in reassembling.

Adjusting Motor Chains

In Fig. 1 is shown the methods employed by the repair men of a large motor truck maintenance depot, in testing the driving chain adjustment of side-chain driven motor vehicles. The radius rods on either side of the car are so set that when the upper portion of the chain is taut, the lower portion can be lifted about 3 inches. For the adjustment of the driving chains of a well-known pleasure car, however, the following method is advised: Loosen the check nuts at either end of

Handy Piston Ring Holder

Proper Chain Tension—Locating Magneto Faults—Testing Spark Plugs—Rattles and Squeaks

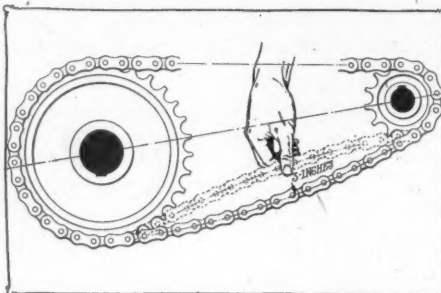


FIG. 1—TESTING CHAIN TENSION

the radius-rod turnbuckles, and turn the nut or sleeve of the turn-buckle in the required direction until the chain is fairly tight, but not too much so. It should be possible to lift the lower half of the chain $\frac{1}{2}$ inch.* After making the adjustment, the distances between the centers of the wheel hubs or shafts and the sprockets at either side of the car should correspond. The object in this is that when the adjustment is made on one side of the car, care must be taken to adjust the rod on the other side of the car to the same length so that the axle will be parallel with the jackshaft. One should be sure to set up the lock nuts of the turnbuckles after adjusting the radius rods.

Magneto Precautions

Operators are cautioned by the manufacturers against the taking apart of the magneto, as all parts that need attention are so arranged as to be accessible, and the taking apart therefore serves no purpose;

besides, only those perfectly familiar with such apparatus will succeed in properly reassembling it. One who is not thoroughly versed in the principles involved in the construction of a magneto learns nothing by delving into its internals, and many a perfectly good magneto has been seriously damaged by ignorant repairmen and amateurs when the trouble was in the spark plug or a loose connection.

Locating Magneto Faults

In locating faults in an ignition system of the dual type, where a magneto is employed, the first thing to do is to run the motor on both systems alternately to ascertain whether the fault is common to both or to only one of the sources of ignition current. If the motor runs well on one system, one is assured that the spark plugs, the secondary or high-tension cables, and everything else from the plugs to the distributor is in good order. Thus the search is simplified to that extent. If, for instance, the battery system is the one that gives trouble, either the battery needs recharging or replacement with a fresh set of cells, or the coil, the battery, the high-tension lead to the distributor, the switch or ground connections are loose, or the circuit-breaking device defective. If the fault is in the magneto system, the trouble may be due to a defective switch, the ground wire may be rubbing against some metal portion of the frame and causing occasional short-circuits, or there is something worn or out of adjustment in the circuit-breaking device.

The best way to test a spark plug of a multi-cylinder engine which is suspected of being defective is to take it out and exchange it with another plug from one of the other cylinders which you know is working properly. Generally this is about the last thing a person does, when it really ought to be the first. When a cylinder misses, short-circuit each of the plugs in turn with a screw driver while the motor is running, to locate the misfiring cylinder by the changes in sound.

Rattles and Squeaks

A light-running and noiseless car is always a credit to its driver; and a good driver owes much of his success to his skilful use of the oil can. In a motor car negligence is the source from which all noises come. It is very annoying to have a car rattle and squeak whenever it goes over a little irregularity in the road, and it is also bad for the car. A neglected squeak becomes a rattle, and a neglected rattle often a wreck. At any rate, give the wearing surfaces of the spring-shackles, radius rods, brake-connections, spring-leaves and other little parts about the car a little oil occasionally, however difficult they may be to reach.

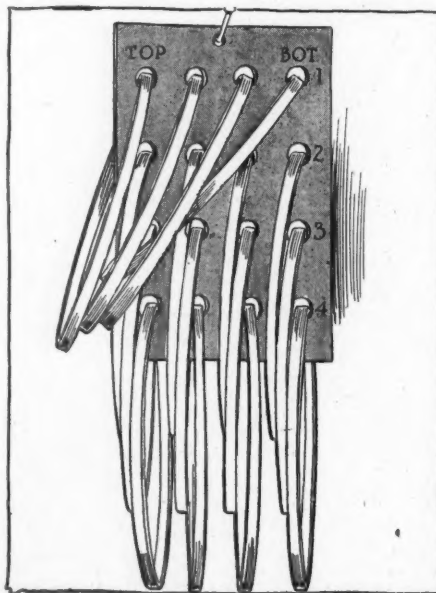


FIG. 2—PISTON RING HOLDER